THE OPTICAL

MAGIC LANTERN

— JOURNAL —

AND

PHOTOGRAPHIC ENLARGER.

A Magazine of Popular Science for the Lecture-room and the Domestic Circle.

Edited by J. HAY TAYLOR.

[Entered at Stationers' Hall.]

Vol. 6.—No. 78. NOVEMBER, 1895. Double No., Price 2d., Post free 3½d.

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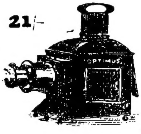

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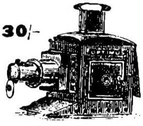

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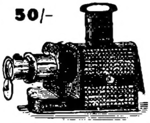

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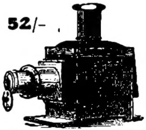

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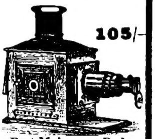

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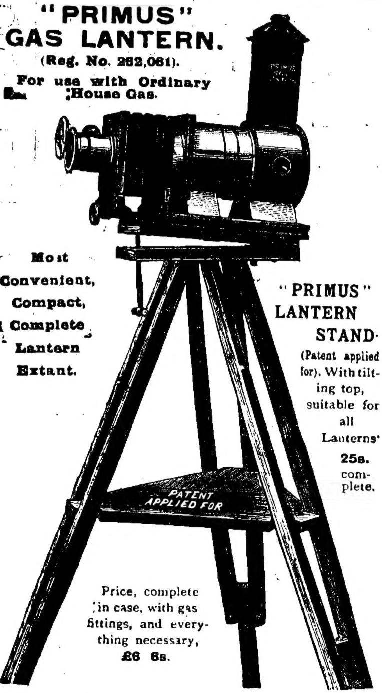

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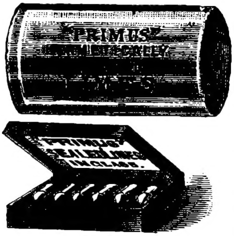

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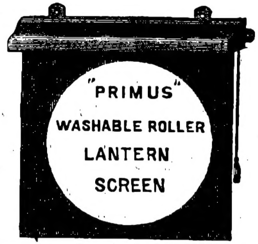

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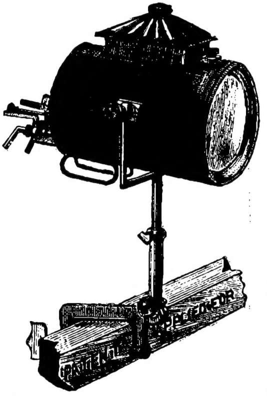

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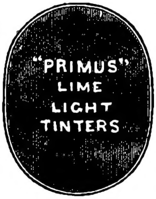

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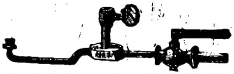

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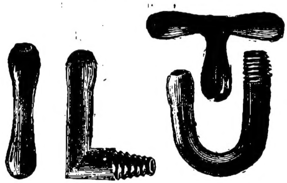

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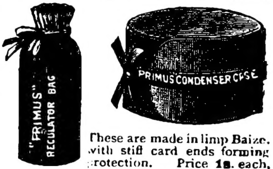

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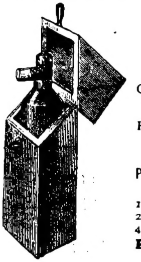

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First twenty words, 6d.; every three extra words, 1d. Trade Advertisements in this column, 3s. per ½-inch.

A PRACTICAL Lanternist of 20 years' experience is open to engagements, with or without his own apparatus, in town or country, on very moderate terms. Reference, Editor of this Journal.—Address, Optics, 13, York-street, Walworth, London, S.E.

FOR SALE.—Steward's Improved Portable Triple Lantern, with three-draw telescopic fronts, improved jets, and patent registering stage runners and stops; in thoroughly good order and condition; price £30. Also several hundred Hand-painted Slides and Dissolving Views to fit the above.—Full particulars on application to Daniel Doncaster, Green Bank, Sheffield.

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MAGNIFICENT Slides, best coloured photos, in sets with lectures. 60 Round the World, 25s.; 50 Rhine Tour, 20s.; 40 London, 15s.; 40 India, 15s.; 80 Holy Land, 32s.; 50 North Wales, 20s.—20, Pickering-street, Everton, Liverpool.

WANTED two bulls' eye condensers for limelight, not less than 8 inches, no rubbish, on approval.—R. Firth, Mossley, Manchester.

PREMIER Bi-unial Lantern, by Watson & Sons, 313, High Holborn, almost new, first quality, 4 in. condensing lenses and 3 sets of new double combination acromatic front lenses of different foci, improved dissolving tap and oxyhydrogen jets (for fuller details see Watson's list), complete in case, £22, cost over £33; 1 cylinder regulator, £1, cost 30s.—R. M. C., 12, Strathray-gardens, Belsize Park, London, N.W.

SLIDES prepared from negatives in the best possible manner, 6s per doz; customers own slides coloured (artistic and effective), from 4s. 6d. per doz.—T. T. Wing, Chatteris, Cambs.

NEW Photographic Slides including Temperance, Biblical, Historical, Comic, Hymns, etc., etc. Beautifully coloured chromo-litho slides, 4s. set of 12; complete with reading, lists free.—T. T. Wing, Chatteris, Cambs.

WESTMINSTER Abbey, A splendid set of 80 lantern slides; 8d. each, or 40s. the set.—John Stabb, 154, Queen's-road, Bayswater.

LANTERN Slides.—Animals at the Zoo, a first-rate set of 80, 6d. each or 40s. the set; 100 London Views, 50 the Thames, 30 Ilfracombe, Lynton and Clovelly, 30 Brighton and Worthing, 40 Tower of London, 1 Flash of lightning, 30 Hastings, Eastbourne and Tunbridge Wells; all at 6s. per dozen. Tower Bridge, 4 for 3s.; Great Wheel at Earl's Court, 2 for 1s. 6d.—John Stabb, 154, Queen's-road, Bayswater.

FREELY given to all, a copy of the "Tit Bit Guide to Photography," 56 pages.—Send one stamp for postage to Tylar, High-street, Aston, Birmingham.

BI-UNIAL Lantern, mahogany body, 4 in. condensers, brass fronts, 3 sets of lenses, cylinder (20 ft.), sheet (17 by 15), and all accessories, nearly new. Cost £25; will take the low figure of £10 the lot.—Wm. Lowry, Ponders End.

Continued on page xxiii.

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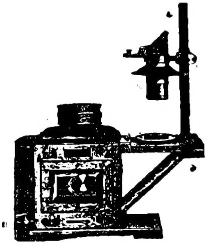

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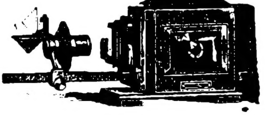
The Cheapest and best Educational Lantern in the Market, **£7 5s.**



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British History Slides and Map Slides; over 500 subjects; 9s. per doz. Sample Slide and Postage, 1s. each. Lists Free. Liberal Trade Terms.
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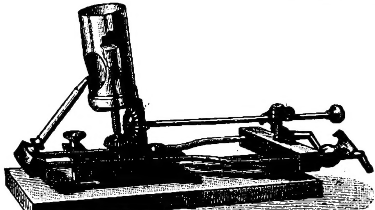
Is the Jet for the coming season, absolutely safe, brilliant light, equal to mixed jet and hard lime; gas at ordinary pressure from the main can be used.
Read the following report (*Optical Magic Lantern Journal, November,* 1894) *on the Candle-power of various Jets, by Mr. W. J. Coles, A.M.I.C.E.:—*



Ordinary blow-through Jet, soft lime ..	260 candle-power.
Wood's special blow-through Jet ..	475 " "
Ordinary mixed Jet, hard lime.. ..	475 " "

Price of Jet, best workmanship and finish, £1 11s. 6d.
Send for Wood's Catalogue of Lanterns and Slides on Sale or Hire, post free, three stamps.
E. G. WOOD, 74, Cheapside, LONDON.

THE OPTICAL

MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

Vol. 6.—No. 78. [Entered at Stationers' Hall] NOV., 1895. Double No., Price 2d.

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Notices.

The *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price One Penny, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free:—

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EXCHANGE Column, General Wants, &c. (not Trade)—First 20 words, 6d.; and for every 3 additional words, 1d.

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EDITORIAL communications must be addressed, J. HAY TAYLOR. Advertisements and business communications to **Taylor Brothers, 56, Chancery Lane, London, W.C.**

American Agents:—The International News Co., 83 and 85, Duane Street, New York City.

NOTICE.

	Each.	Postage
Binding Cases for 12 numbers	1/-	1½d.
Reading Cases with 12 cords at back	1/3	1½d.
Bound Vols. for 1894	3/-	1½d.

Notes.

A LARGE selection of slides for solid instruction are being made by Messrs. Newton & Co., and these are meeting with great favour. They include such subjects as garden produce, battles, birds, flying bullets, human physiology, hygiene, history, steam engines, sugar industry, wood carving, etc. One of the latest sets added, is an excellent one on Hops and Hop culture, the work of Mr. T. E. Freshwater, F.R.M.S., F.R.P.S., who spent a lengthened holiday in their midst, all who see the set will be of the opinion that success has crowned his efforts.

* * *

THE Eastman Kodak Co., of New York, have purchased the business of the Boston Camera Manufacturing Company, and will continue the manufacture of the full line of Bull's-eye Cameras. The Eastman Photographic Materials Company of London expect a supply of these useful cameras, and at the present time are prepared to supply films for them.

* * *

MR. DAVENPORT has just reason to feel proud, not only is the lantern slide carrier which bears his name liked by all who have tried it, but he has been awarded the first silver medal at the Royal Cornwall Polytechnic Exhibition, Falmouth, for his adaptation of the Davenport Arc Lamps to Lanterns.

* * *

SLIDES (26), illustrative of the making of Cambridge sausages and pork pies, together with a reading for same, have been brought out by Mr. A. H. Saunders, 36, Heath-street, Birmingham. Judging by the reading, this set should prove of great interest.

In next issue will appear the second part of the "Phantasmagoria," by Mr. Edmund H. Wilkie, late of the Royal Polytechnic Institution, in which he gives a graphic description, with illustration, of how it is worked behind the scenes.

* * *

The lime-light jet competition suggested by Mr. Andrew Pringle in our columns has been arranged to take place on 20th inst., at 8 p.m., at the Photographic Club, Anderton's Hotel, Fleet-street. Visitors are welcome.

* * *

Informal lectures, or "Talks," with limelight effects, are being made a special feature of their educational programme, by the London Young Women's Christian Association.

* * *

Professor Himes gives it as his opinion that the stereoscope is more effectual in instruction than the magic lantern, and urges as its claims. A photograph seen through a stereoscope would in schools act instead of a model. A series of seven views of the stereotyping and printing plant of the *North-Eastern Daily Gazette* has just been issued by Mr. Siddon, 80, Marton-road, Middlesbrough, representative of Messrs. Underwood and Underwood, of New York, who make a speciality of stereoscopic work. The views are clear and distinct, enabling anyone to form a good idea of the various processes used in the publication of a paper.

* * *

We learn that Messrs. Archer, of Liverpool, are now putting up calcium carbide in sixpenny experimental doses for the benefit of those wishing to experiment in making acetylene gas. They have for some time past been studying as to the best way to adopt this gas as a lantern illuminant.

* * *

Towards the latter end of next month the old-established firm of wholesale opticians, Joseph Levi & Co., who have for the greater part of half a century occupied premises in Furnival Street, will remove to larger premises at 97, Hatton Garden.

* * *

Mr. E. G. Platt has increased the size of his factory, and laid down extra plant, so as to ensure his numerous orders being completed and sent off with promptitude.

Collapse of the London County Council's Suggested Regulations.

We have received a great many letters stating that it was mistaken policy to let the public know about the new regulations that were about to be enforced by the London County Council with respect to lantern exhibitions, as they might be the means of frightening people. The conditions stated by Mr. Norton in our Oct. number were so absurd, that we considered it well to show in what manner they were ridiculous, that being the best manner of opposing them.

We have taken special pains to see that a marked copy of this Journal was brought before each member of the Limelight Committee of the London County Council, and after reading it they could only form one opinion, and the result is that they have decided not to print and issue these suggested regulations.

Those readers who showered upon us such letters as they did, will now see that they have something yet to learn, for had we not obtained the early information, and published it in the manner we did, lanternists might have been saddled with a lot of restrictions, which after being issued, might have caused a deal of trouble to get withdrawn. However, we understand the matter is nipped in the bud, and the nipping was done by the article in question.

——:o:——

Lamps for Generating Acetylene Gas.

An invention has lately been perfected by M. Rossbach-Rousset, of Berlin, whereby acetylene gas can be generated as used.

According to a patent recently taken out by him in this country, the following description is given:—

In the drawing, which shows the lamp of this invention in vertical section, (A) is an outer casing, (B) a pressure casing, (C) a carbide of calcium container, (D) a wick or wicks, (E) a spring, (E^1) a spring catch or pawl, (F) the burner, (G) a water container, and (H) a float with valve (I).

The container (C) in which carbide of calcium is placed, is normally pressed upwards by the spring (E), and moves downwards against the resistance of the spring according as the volume

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ESTABLISHED 1852. *TRADE* **'OPTIMUS'** *MARK.* CATALOGUE POST FREE.

"OPTIMUS" MAGIC LANTERNS SUITED FOR DRAWING ROOM AND LECTURE HALL.

Limelight may be adapted without alteration at an extra cost of 16/-

Each Magic Lantern is efficient for exhibitions. The Lens gives crisp definition, being a superior Achromatic Photographic Combination with rack and pinion. It is fitted to a telescopic lengthening tube, so gaining increased focal accommodation. The Condenser is composed of two plano-convex lenses of 4 ins. diameter. The refulgent lamp has 3 wicks, yielding a brilliantly illuminated picture. Each is complete in box.

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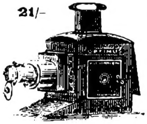

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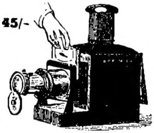

Students' Lantern (to take demonstrating tank) with Brass Sliding Tubes, **45/- 55/- 60/-**

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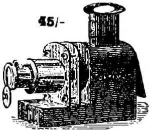

Russian Iron Body, Brass Sliding Tubes.

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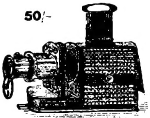

Perforated Russian Iron Body, Brass Sliding Tubes.

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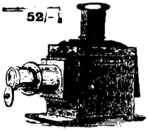
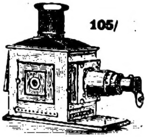


Mahogany outside Body, Two Panelled Doors, Metal Stages and Sliding Tubes.

105/



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The Top Lantern may be used separately with Oil Lamp.

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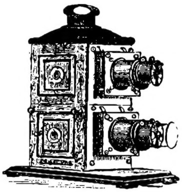

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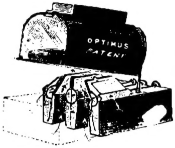

MR. THOMAS BOLAS, in "Photographic Work," says:—"The light certainly surprised us . . . the brightness—and, above all, the whiteness—of the disc, recalling a limelight, while that smell of paraffin which, in greater or less intensity, seems the inevitable accompaniment of the oil lantern, could not be noticed by us."

NATURE.—"Lanternists will be glad to learn that Perken, Son and Rayment have introduced a new oil lamp, possessing three times the candle-power of those hitherto used for lantern projection. For small audiences the lamp will suit a lecturer's purpose quite as well as the limelight."

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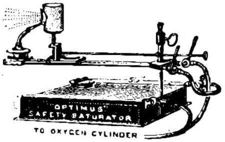
FOR OPTICAL LANTERN ILLUMINATION.

Complete with suitable Jet, 70s.

FREDERICK E. IVES, of Color Photography fame, SAID in a recent address: "In my opinion the best of these inside-lantern Saturators yet produced is that of Perken, Son and Rayment, of London . . . It will not become unduly heated in the lantern, as some of the others might, and is a model of compactness and convenience. I think so much of it that I have ADOPTED IT FOR MY OWN USE."



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OXYGEN of Guaranteed Purity supplied in Cylinders of the Best BRITISH Manufacture, and complying with all the established Trade and Railway Regulations.

The public are respectfully informed that all Cylinders which are filled by the BRIN COMPANIES (whether their own or their Customers) are labelled with the Companies' Trade Mark. This label guarantees the purity of the Gas, and is a further guarantee that the Cylinder has been tested and proved sound in every respect by the BRIN COMPANY which has filled it. Customers who wish to procure BRIN'S OXYGEN are requested to see that the Cylinders supplied to them bear this label, which is also stamped with the date on which the Cylinder was filled.

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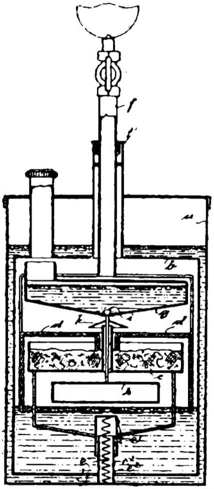
of the decomposed carbide of calcium increases; its upward movement being limited by the spring catch (E¹) taking against one of the projections (E²), or the like provided on a tubular part which encloses the spring (E), said catch being disengageable when desired by any ordinary suitable means.

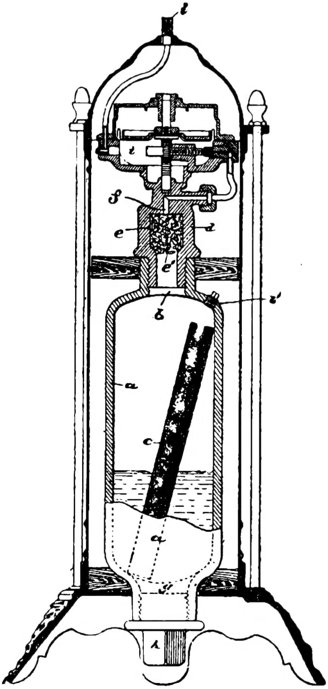


The water for the decomposition of the carbide of calcium is drawn partly from the water in the lower part of the casings through the wicks (D) and distributed in fine particles over the carbide of calcium, and is partly supplied direct from the water container (G) past the valve (I), which is operated by the float (H), the water first falling upon the guide cone (K) and then spreading out on to the wick. Upon the commencement of the evolution of the gas, the float lifted by the water will open the valve (I) and water flow past this to the carbide of calcium through the wicks (D) in the form of fine particles. When the requisite gas pressure is attained the floats falls, by reason of said pressure lowering the level of the water, and the valve (I) closes, the further supply of water then taking place through the wicks, so that the supply of water to the carbide of calcium is regulated automatically by the pressure of the gas, or only one of these two ways for the supply of the necessary water for the decomposition of the carbide of calcium may be adopted, namely, the float and valve appliance for the larger kind of lamps, and the wick appliance for the smaller kind.

The wicks may be lifted out of the water and thus completely stop the production of gas by raising the burner tube through the stuffing box or gland (F¹), or by making the burner tube telescopic and sliding the lower part of the same upwards.

The following is another form of generator, of London origin :—

A metallic cylinder is represented at (A), at the lower end of which is a screw plug (G H) for cleaning purposes. Water and a stick of calcium carbide are introduced by unscrewing either (D) or the plug (B¹). The gas is at once confined under pressure, and passed as required through (E) into a regulating chamber (I); thence out at (L) to the burner. We understand that the inventor, Mr. E. G. Gearing, has with one charge obtained a high candle-power which has been maintained for several hours.



Coloured Fire for juvenile Readers.

By "Old Man."

I presume that I may safely venture the assertion that the greater portion of the readers of the Optical Magic Lantern Journal are grown people, and that those grown people are for the most part men, also that among these men many have two, three, or perhaps four sons. Those sons, at least the juvenile portion of them, like boyish amusements just as much as those of forty or fifty years ago did. I was once a boy myself, although that is now long ago. I recollect with much pleasure certain experiments I made about the Guy Fawk's time of year in connection with the making of coloured fires.

What I have to say is to those boys (sons of the readers if you like) who in their yet young years like to celebrate the anniversary of the gunpowder plot, and who on the fifth of this month will be letting off a series of squibs, rockets, and other fireworks in their back garden, or perhaps more properly speaking in this enlightened age, *the ground adjoining their residences.* When I was a boy coloured fires added greatly to the zest of those occasions, and as it is much more interesting for one to make his own coloured fires than to purchase the same ready mixed, I submit the following, which are considered by an expert to be the most approved formulæ.

Red—	Nitrate of Strontium...	40	parts
	Charcoal	1	„
	Sulphide Antimony, black	4	„
	Chlorate of Potassium	5	„
	Sulphur	13	„
Green—	Sulphur	21	parts
	Chlorate of Potassium	13	„
	Nitrate of Barium	66	„
Blue—	Calcium Nitrate	77	parts
	Realgar	2	„
	Charcoal	3	„
	Sulphur	13	„
	Chlorate of Potash	5	„
Purple—	Chlorate of Potassium...	5	parts
	Lampblack	1	„
	Sulphur	2	„
	Potassium Nitrate	1	„
	Realgar	1	„
	Nitrate of Strontium	16	„
White—	Camphor, powdered	2	parts
	Sulphide of Antimony, black	5	„
	Potassium Nitrate...	30	„
	Meal powder	3	„
	Sulphur	10	„
Yellow—	Lampblack	1	part
	Sulphur	4	„
	Nitrate of Potassium	2	„
	„ „ Soda	20	„
Violet—	Chlorate of Potassium	30	parts
	Copper Filings	15	„
	Charcoal	8	„
	Sulphate	10	„
Lilac—	Chlorate of Potassium	49	parts
	Black Oxide of Copper...	6	„
	Sulphur	25	„
	Chalk	20	„
Crimson.—	Nitrate of Strontium	270	parts
	Charcoal...	23	„
	Chlorate of Potassium	17	„
	Sulphur	90	„
Pink—	Chlorate of Potassium	27	parts
	Nitrate „ „	32	„
	Chalk	20	„
	Charcoal	1	„
	Sulphur	20	„

[Since the above article was set up in type, the following paragraph has come under our observation.—Ed.]

At Liversedge an adjourned inquest was held touching the death of Edgar Seed, 19, a farm servant, who was injured by an explosion in his father's barn while experimenting with firework chemicals. Twelve days afterwards a piece of iron an inch and a half long was removed from a wound in his thigh, and he died next morning. Colonel Majendie wrote impressing the illegality of making fireworks even for private use on unlicensed premises. A verdict of "Accidental death" was returned.

——:o:——

Self-lighting Gas Jets—How to make them.

By a Lanternist.

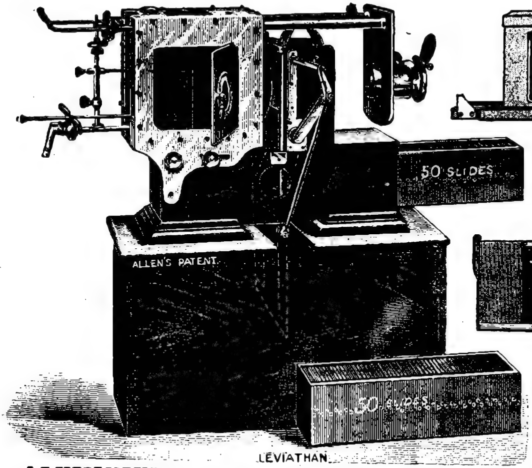
Reading an article *re* "The London County Council and Lanternists" in The Optical Magic Lantern Journal of last month, one cannot help thinking that it is a great wonder that we as operators are allowed to use matches at all, by which to light up our jets, burners, etc. No doubt an electric lighter is a very clever contrivance, but how often in actual use have we to push, push before we can get a light, and at times they will not work, so as a last

Entire Revolution in the Manipulation of MAGIC LANTERNS.

THE LATEST NOVELTY OF THE AGE.
INVALUABLE TO LECTURERS.
FIFTY SLIDES CHANGED IN TWO MINUTES.

The "LEVIATHAN" Automatic and Science Lantern.

(ALLEN'S PATENT.)



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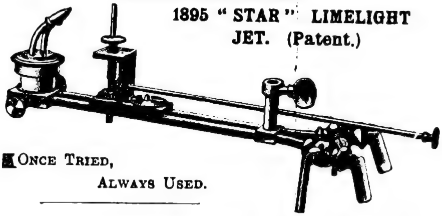

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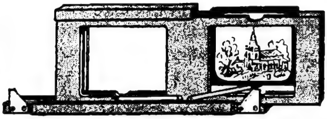
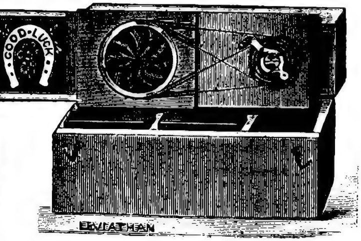
ALWAYS USED.



The 1895 "Simplex" Dissolving Carrier.

The "ARCADIAN" Extra Hard Limes.
The "LEVIATHAN" Lime Cartridges.
In Glass Tubes. "One Lecture, one Lime."

The "LEVIATHAN" INTERCHANGEABLE CHROMATIC EFFECT SET.



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Temperance Alphabet	27	Slides.
Lost in the Snow	18	,,
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Jessica's First Prayer (Revised)	30	,,
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Listen to my Tale of Woe	6	,,
Sham Patient	8	,,
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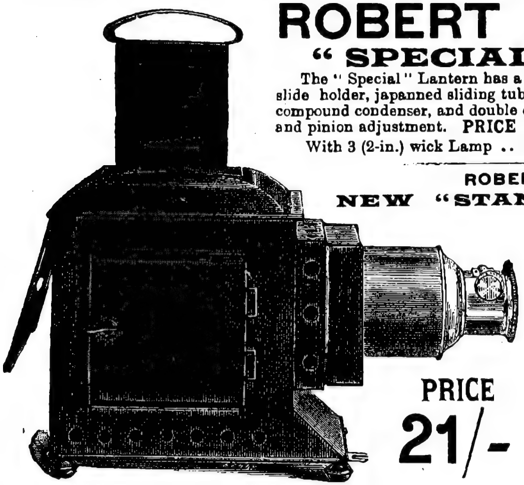

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"SPECIAL" LANTERN.

The "Special" Lantern has a japanned body with dome shape top, spring slide holder, japanned sliding tubes with brass O.G. It has a 4-in. plano-convex compound condenser, and double combination achromatic front lens, with rack and pinion adjustment. **PRICE Complete in Travelling Case—**

With 3 (2-in.) wick Lamp .. 21/- | With 4 (2-in.) wick Lamp 22/6

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NEW "STANDARD" LANTERN.

Complete in Travelling Case—

With 3 (2-in.) wick Lamp 24/-
" 4 (2-in.) wick Lamp 26/-

PRICE 21/-

TESTIMONIAL.

35, Hartland Road, West Ham, Essex,
October 25th, 1893.

DEAR MR. CLARK,—Am glad to inform you that the "Standard" Lantern sent me gave every satisfaction, both as to brilliancy of picture and crisp definition, at our lecture last Thursday evening to an audience of close upon 500. I cannot too highly extol the make and finish of goods sent from your establishment.

Faithfully yours,
JAMES A. SPARKES.

ROBERT H. CLARK'S
NEW RUSSIAN IRON LANTERN

As supplied to the "Silver Star" Society.
(Earl Compton, President.)

Price 70s. For full description see Catalogue.

The following important Testimonial has been received from the Hon. Sec. to the "Silver Star" Society:—

"MY DEAR SIR,—After having used your Lanterns at over 300 lectures in all parts of London and the Suburbs, and various country towns and villages, it gives me much pleasure to say, that they have given us the greatest possible satisfaction. Yours faithfully, WALTER S. ROBBINS."

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Price 4/- per set. 3 sets for 11/9. 6 sets for 23/-. 12 sets for 45/-.

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Bingen on the Rhine
Precocious Piggies
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The Educated Cats
House that Jack Built
Ali Baba
Punch and Judy
Poor Jeremi
Curfew must not ring to night
Bob the Fireman
Dogs and Monks of St. Bernard
Life in the Arctic Region
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Life on Board an Ocean Palace
Life in the Soudan
Celebrated Places of the World
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Romeo and Juliet
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resource one often has to fumble in ones pockets for a match, and finds a "safety," and possibly no box whereon to strike it. What a ridiculous situation for an operator, and possibly the audience has been waiting during this time to watch some effect or other. Well, the time has come that every user of gas should not have the desire to use matches, and our dear old friends will eventually be laid aside for something more modern.

The bye-pass and the electric lighter have had their day, and the idea that I am about to disclose is without doubt the only one that can justly lay claim to the name of "self-lighting." The lighting as I have stated is not effected by electricity, or by a small jet of gas being left lighted at the side of the burner, or by any of the mechanical contrivances that have been before the public so long, but is caused by the action of the gas itself on the substance of which the lighter is composed. When the tap is turned on in the ordinary way the gas lights. I will not confine myself to the lanternist's point of view only, but to everyone who uses gas for whatever purpose, and in the same light I will speak of its use or adaption, not for lime-light jets alone, but for nearly every burner which consumes gas in the ordinary way, so when speaking of a burner it is in the broad sense, the principle and the method of application are sufficiently exemplified by the sketches. This novelty which is here introduced to my readers, is without doubt one of the most ingenious applications to a useful purpose of a well-known physico-chemical phenomenon that has lately come under our notice.

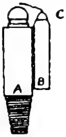


Fig. 1

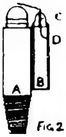
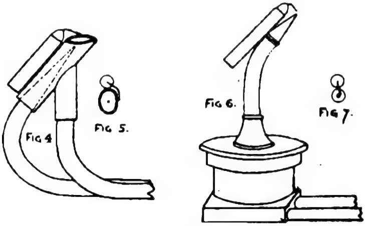


Fig. 2

Fig. 3.

In Fig. I. and II. (A) represents the ordinary burners, at the side of which is the lighter attachment (B) consisting of a piece of brass tube ¼ inch diameter, ¾ inch to 1 inch in length; a hole is drilled in the side of this, ¼ inch from the top, the latter being slightly turned over. In the top of this tube there is a small plug in the shape of a round-headed cone, made of platinum black (C), which is moulded into proper shape after being placed in top of tube (B); through the centre of this cone run a fine pointed needle, leaving two small holes. Procure a small piece of fine pure platinum wire 1¼ inches in length, bend in half, and put the two ends through the centre hole in cone and make the ends come through the hole bored at side of tube at (D), Fig. II., and solder them so that they cannot slip out or back. Give a slight twist to the loop end of the wire with fingers, which will strengthen it, and then bend over so that it comes to the centre of the burner nipple, with which it should run parallel, see Fig. III.

Fig. IV. shows the lighter attached to an ordinary limelight blow-through jet, where it is fixed so as to be out of the way when the oxygen is streaming through the blow-pipe, and in Fig. V. it will be seen that the platinum wire is bent round so that its doubled end comes just to one side of the coal-gas outlet, so that when the gas is turned on, the vapour rises and comes in contact with the wire, it glows, and it is best placed in this manner so as to be out of the great heat during the use of the jet. Fig. VI. shows the lighter applied to a mixed jet, and the position of wire is there shown at Fig. VII., so as just to catch the gas when the hydrogen tap alone is turned on.



At first one may not just hit upon the accurate place for wire to finish at, but that is easily found by a little practice; and when it is determined do not let anyone meddle with it. The above is a most important addition to a lime-jet in every way, especially in a theatrical lime-box, as one is always independent of matches, etc., and should your pipe at any time get trodden on, and the light goes out, it is instantly on again as soon as the pressure is taken off the pipe.

This is briefly the whole arrangement, and by carefully looking at illustrations one will soon understand the method. All that is now required to light the burner is to turn on the gas, which has the effect of making or causing the porous plug to glow. This happens in less than six seconds, and the draught of air coming through the small tube instantly helps to raise the temperature of the small platinum wire to a point at which the escaping gas is ignited. So beautifully simple and effective an appliance as this has nevertheless taken a long and arduous process of development, and it has taken many years to overcome the numerous difficulties met with in the course of efforts to make coal-gas light itself by taking advantage of these properties of platinum, the chief trouble being to obtain a material to carry the platinum which would enable the operation to be completed quickly enough, and yet stand a fair amount of knocking about in transit, wear and tear. Asbestos, would of course suggest itself, but that proves disappointing. The material now selected is not at all fragile, though of course it will not bear to be roughly handled. I am informed that the permanence of the effect of lighting gas in this way has been ascertained by a protracted course of testing, representing many thousands of ignitions and extinctions, besides the test of keeping burners continuously alight for months at a time, and in spite of all this the material was found of the same weight and to act as well as ever.

The advantages of a self-lighting gas-burner are many:—Simplicity in lighting, making gas the rival of electricity, for it is simply a matter of turning on the tap and the gas lights in a few seconds. A whole house, workshop, or theatre, can thus be lighted from the meter. In places where a bye-pass is now used it will be no longer necessary, the tap can be fixed in any convenient position, making this adaption especially suitable for outside lamps, or places out of reach, one self-lighting burner being sufficient to light any group of lights.

No matches, tapers, or spirit torches being required, there is of course less risk of fire.

It will prevent the escape of gas should a tap be turned on through carelessness, or if a light be blown out, the gas will at once ignite itself.

It will save gas in places where a light is only occasionally required, and it will be no longer necessary to leave a small jet always burning. On entering a room the gas can be lighted by simply turning a tap.

It will be invaluable for sick rooms from the ease in lighting, and the atmosphere will be purer, as less gas will be consumed.

To all users of gas, a self-lighting gas burner will be a convenience, and where gas is only occasionally required this idea will be found to be invaluable.

The self-lighter will outlast most ordinary burners.

I have found it of great use in the dark room for making exposures for lantern slides, etc., and it is a great saver of mess and litter, there being no odds and ends of matches laying about, and another thing, the light being up only at the time it is wanted it does not make the room smell so stuffy as when a pilot-light is employed, for this purpose I consider it equal in a sense to the electric light, if only a small light be wanted.

It was once regarded as a wonderful thing to get "light without a wick," and it is no less so to be able to make gas light itself without having to bring to it a flame or a spark. The possible range of this invention is immense. It will enable us to dispense with the pilot-light—that usually evil smelling, wasteful adjunct to all kinds of enclosed gas-burners. And among other benefits, it should be an effectual cure for the peculiar American complaint of "blowing out the gas," which figures so frequently in the United States mortality statistics.

—:o:—

A Cheap Oxygen Outfit.

By Rev. W. H. Young, Ph. D.

For the benefit of clergymen who constantly require the limelight in their churches, and who cannot afford to purchase gas bags, retorts, cylinders and such like, I give herewith particulars of a cheap and effective outfit.

The whole outfit cost me in the vicinity of one guinea; but had I not done most of the work myself, it would have cost more. I find it much more durable, convenient, and effective than anything I could have purchased for at least ten times the money. This design makes it possible to build a gas holder in one's own house. It would be useless to a travelling lanternist, but it exactly meets the requirements of persons like myself, who use the lantern constantly, and in the same place.

For the American equivalent of two shillings, I obtained a large vinegar barrel with one head removed. Through the remaining head I bored a hole at its centre, and screwed into it (perfectly water-tight) a piece of gas-pipe as long as the barrel was high. The barrel was then placed open end upwards in the church basement, and filled with water.

To the end of the pipe protruding from the bottom of the barrel I screwed a T piece, and to this attached other pipes leading on the one side up-stairs to my lantern, and on the other side to the retorts.

The retort consists of a 14-inch length of 2-inch steam pipe with cap on both ends, one

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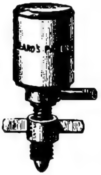

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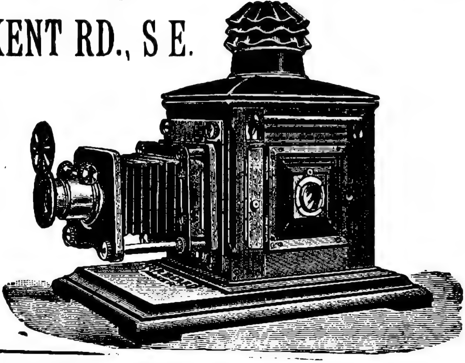

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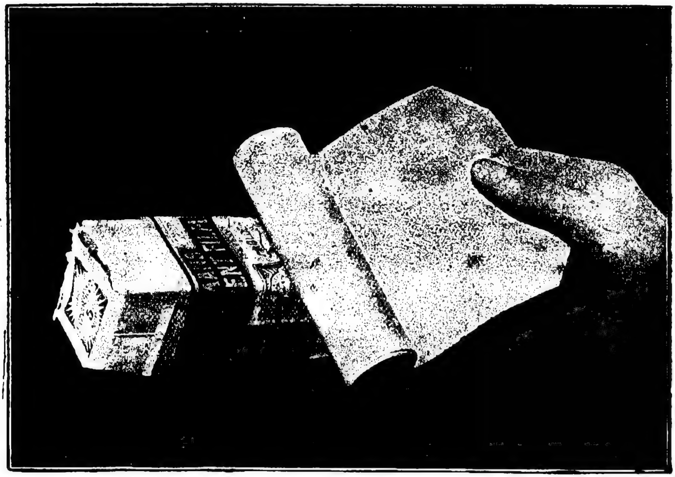

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R. P. GRACE, Esq., writes: "In the last 500 exposures I have not had a defective film; none of the negatives have been touched."

E. R. KENNEDY, Esq., writes: "I cannot repress an expression of satisfaction: this was the eighth spool I have used since the 1st of May; and of 300 exposures there is not one unsatisfactory."

J. W. HARRISON, Esq., writes: "I am pleased to say that the last film I had from you has given me the greatest satisfaction. It has produced most excellent results and uniform work."

A. HOMER HAWKINS, Esq., writing about last season film, says: "I have just developed 30 photographs from the spool you sent me last summer, and am very well satisfied with the results. I was afraid they would not turn out well, as they were in the Kodak some six months after the period for which you guaranteed them."

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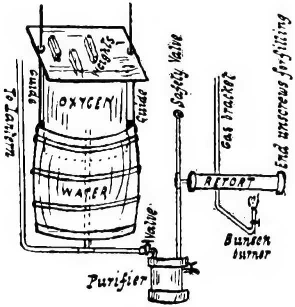
being drilled so as to connect with the smaller pipes.

The purifier is a 6-inch length of 4-inch steam pipe, both ends supplied with caps screwed on. Into one of the caps I drilled two holes to receive the inlet and outlet pipes. I also fitted two taps, one at the bottom in order to facilitate emptying, and another near the top so as to ascertain when it was full.

For the sum of five shillings I got a tinsmith to make a galvanised circular iron tank, about the height of the barrel, and of such diameter as would enable it to slide easily inside of it. Two strips of galvanised iron were rivetted cross-wise with a piece of thick rubber belting between, and a hole cut a little larger than the pipe in centre, which acts as a guide to the holder. Next two uprights were attached to the sides of the barrel, so as to guide the top of the gas tank. These guides were made of $\frac{3}{8}$-in. iron rod. A wooden slab was made to place on the top, and into this were made holes to enable the uprights to pass through. So as to get the necessary pressure, bricks or other weights are placed upon the wooden head. The apparatus is now complete, and will be found to hold sufficient gas for an hour's exhibition with mixed jets, and the gas can be generated and ready for use at a moment's notice. I always buy my chemicals by the keg, at wholesale rates, so that my gas costs me about sixpence an hour.



The diagram will enable one to follow the position of the respective parts of the apparatus.

——:o:——

On going to press, we have received a copy of the new catalogue of Jas. Levi & Co. (Leviathan). It contains a splendid assortment of lanterns, and a huge list of sets of slides.

Holder for a Developing Set.

By H. P. D.

It is only right for me to commence by saying that I got the pattern of this convenient holder from Mr. J. Hay Taylor, our Editor, who had made one for himself, and kindly showed it to me when I called at his office; and whatever credit is due should be to him, and also to Messrs. Butcher, for it was the latter who introduced the bottle clip, which, I presume, suggested to Mr. Taylor to make the stand. However, I find it one of the most convenient little articles I have in my outfit. When I am about to make any lantern slides (which I do in my back-parlour), I have all the necessary chemicals at hand, and these can be moved at one lift.

When I set to work to make any apparatus, I always endeavour to do my best, and for the sake of the little difference in price between soft and hard wood, I always select the latter; consequently I made my stand of walnut.

Before commencing, it is necessary to get half a dozen of the Primus bottle clips, as shown in Fig. I. It will not be essential to give the measurements of the stand, for the clips being all of one size these must be arranged to suit them. The base (E), after being marked out, is cut into shape with a fret-saw, as shown in Fig. II., and on this at right angles is fastened the upright at (F). With the addition of a simple handle, the whole thing so far will assume the aspect of Fig. III. The clips are next fastened, two at either side, and one at either end, at the positions (A) (B) (C) (D). After finishing off the wood-work, it can then be

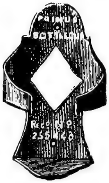


Fig. I.

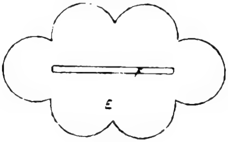


Fig. II.

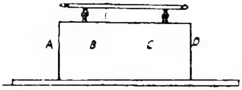


Fig III

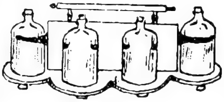


Fig. IV

taken apart for the purpose of French-polishing —(the reason for French polishing will be seen in a minute or two)—after which it is again put together, the handle, clips and feet attached, and it is ready for the bottles, when it should have the appearance of Fig. IV.

The idea of French-polishing a stand of this kind may appear unnecessary, but I will tell you why I did so. Remove the bottles, and in their place substitute ordinary domestic tumblers, and we have at once an ornamental stand fit to place on a supper table. In this way the same stand can serve two purposes, and those who do not want such a thing for bottles, may be pleased to make one for domestic use.

—:o:—

Lantern Slides by Reduction, Experimentally Demonstrated.*

By J. H. Baldock, F.C.S.

In selecting our title, we make no apology for saying lantern slides by *reduction*, because, although we know that it is in a sense somewhat easier to make them by *contact*, yet we think no one will be found to admire a square picture ; it is the oblong shape, either horizontal or vertical, that gives the most pleasing results.

Granting this, the next question is the means to be employed in producing the slide ; this may be done either by means of a special piece of apparatus, such as we show you here, and which is called a reducing camera, or an ordinary camera may be used, simply supporting the negative, of whatever size, in a frame perpendicularly in front of it, at the proper distance, and throwing a black cloth over the whole except the negative, which, of course, has to be illuminated.

The distance, of course, will depend partly on the focus of the lens employed, and partly on the size of the negative it is required to reduce ; this is very easily found on trial, and when found a note of it should be made for future use ; tables also are published giving distances for different focal lengths and different sizes.

Having now got everything in readiness, our negative in position, and our lantern plate in its dark slide, the next question is as to the illuminant, and here a further question arises whether or not we are going to use a condenser ; of course if we employ daylight, no condenser is necessary, but then daylight is a varying quantity, and everyone has not the opportunity of working during the hours in which sunlight is available. We are, therefore, compelled to find other modes of illumination. A simple one consists in placing a piece of ground glass behind the negative, a paraffin lamp *behind and at each side of it* at a distance of some six inches, and behind the lamps, facing the negative at about one foot, a sheet of white cardboard. Another plan is to illuminate the negative, backed with ground glass, by means of the cone of rays projected from an optical lantern.

Where a condenser is available, the process becomes simplified, and the exposure shortened, but it must be borne in mind that for large negatives very large condensers are required ; thus, while a 6 inch condenser does for a quarter-plate, an 8 inch or 9 inch is required for a half-plate, and at least a 10 inch for a whole-plate, and the price of these rises rather rapidly as the size increases.

The little apparatus we have here we made ourselves, and is available, as you see, for either daylight or artificial light at will, the condenser, for compactness sake, being a 6 inch Hughes' rectangular. With this we will now proceed to make an exposure or two, using lime-light as our illuminant. The *time* here will be very short, from two to five *seconds* being sufficient, as against two or three *minutes* by daylight, and four to six *minutes* by the reflection method. As in all photographic operations the time of exposure presents the greatest difficulty. No hard and fast rule can possibly be laid down; an ounce of practice in this direction is worth more than a pound of theory, but we may say this, that as in the case of the original negative, *do not under-expose*, err rather in a little over-exposure ; a lantern slide picture should come up readily, with good detail and density, without forcing. It must, however, be borne in mind that a slide intended for exhibition by means of the light time must be of greater density than one shown by an oil lamp, because of the greater penetrating power of the former.

In the matter of development we have a wide range of agents to select from ; hydroquinone is a favourite with some, though, we think, it is sometimes apt to give rather black and white pictures. Ferrous oxalate again is with many given a preference, but it requires care and *cleanliness* in its use, otherwise we may get a deposit on the film of oxalate of lime from the water, or of iron ; true we can remove these by means of

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*Lecture at Croydon Microscopical and Natural History Club.

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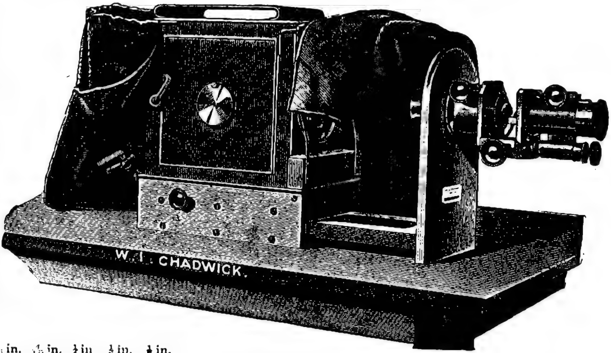

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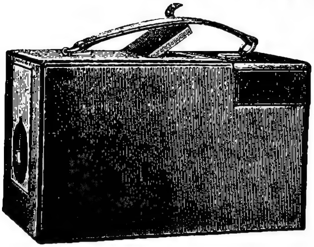

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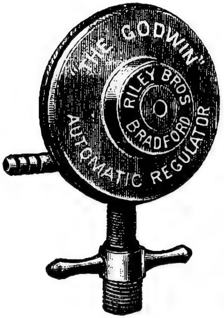

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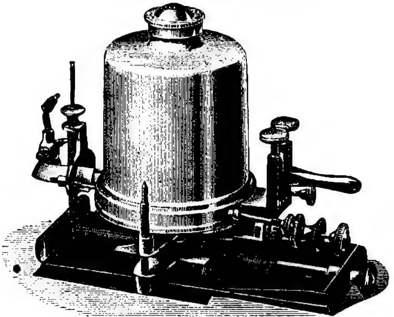

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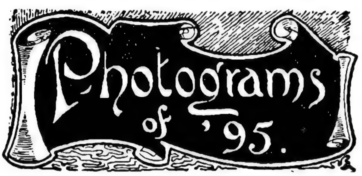

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a bath of dilute hydrochloric acid, but if this is not washed thoroughly out, we shall get a deposit of sulphur when the plate is fixed.

Amidol, dissolved dry like pyro, at the time of using, in sodium sulphite and water, gives very pleasing tones. Metol, too, gives tones leaving little to be desired, and a very good formula for this developer is as follows:

A.

Metol	100 grains.
Sodium sulphide	2 ounces.
Distilled water to	20 ounces.

B.

Potassium carbonate ..	¾ ounce.
Sodium carbonate crystal ..	1 ounce.
Potassium bromide	40 grains.
Distilled water to	20 ounces.

Dilute with water for less density, and add bromide of potassium in case of over exposure. Then last, but not least, comes our old friend pyro and ammonia, with or without the addition of ammonium carbonate; as suggested in the formula published by Thomas, a variety of pleasing warm tones are obtainable, thus depending chiefly on the length of exposure.

A matter of importance in a really good slide is the sky portion. Nothing looks worse on the screen than a vast expanse of white, with nothing whatever on it. It is not difficult to print in clouds, assuming that the original negative fails to produce them in the lantern slide. It is only necessary to give a second and brief exposure to a cloud negative, the landscape portion of the slide being blocked out. The cloud negative must be suitable to the subject, taken at about the same time of day, and of course lighted from the same direction. It is usually unnecessary and undesirable to have very pronounced clouds, unless some striking storm or other effect is to be attained, the object being rather to produce light, fleecy clouds in harmonious keeping with the landscape. Another plan is to print the clouds on a separate plate to be used as a cover glass, but in this case the film side of the *negative* must face the condenser and not the camera, *i.e.*, reversed, and this plan has several advantages: it is easier to work, and there is no risk of spoiling the foreground portion of the slide by an unsightly junction.

Should the slide when finished prove to be too dense, or damaged by fog caused by over-exposure and development, it may generally be remedied by placing it for a short time in Farmer's reducing bath, consisting of three drops a of saturated solution of ferricyanide of potassium to each ounce of a 10 per cent. solution of hypo, watching very carefully till the desired effect is produced. Here, too, local reduction by means of a camel-hair brush may be made, just as in development local strengthening of the image may be produced by the same means.

If, after all, the image prove too thin, recourse may be had to intensification. The full details of this process were given by us in a paper, published in the photographic journals for April 7th, 1893, to which we refer you. The *colour* of the image, too, may be varied, and this is called toning, of which we give you an example or two. By the kindness of Mr. C. H. B. Sparrow, one of our members, we are enabled to show you a few slides toned in the Venus combined bath, by means of which some very pleasing warm brown tones are obtainable. But prevention is better than cure, and it is always advisable to endeavour to obtain a perfect slide in the first instance than to have recourse to a number of processes, which, after all is said and done, are mere photographic dodges.

——:o:——

Scientific Experiments for the Lantern.

By E. Drew.

It is well known that, when a needle freely suspended upon its axis be taken to different parts of the earth's surface, the needle has a tendency to dip more or less according to the part at which the observation is made. As, however, one cannot be taken to the different parts of the earth's surface, still by means of a simple piece of apparatus we are enabled to show the same effect upon the screen, and convey to the minds of the students present the phenomenon in question. A circular piece of wood about six or eight inches is turned, and across this is cut a slot for the reception of a bar magnet the same length as the diameter of the disc of wood used. The disc is then

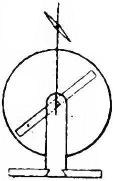

Fig. I.

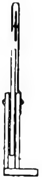

Fig. II.

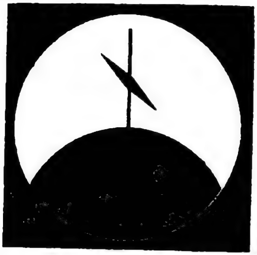

Fig. III.

mounted between two uprights, and above the disc is supported a needle capable of moving in a vertical direction.

The apparatus can either be shewn by the first or second method, as described in the Lantern Journal, No. 77, page 155. The second method will dispense with the use of an erecting prism, as otherwise it would be necessary to show it upon the screen inverted. Fig. I. is a front elevation, and Fig. II. an end view of the piece of apparatus. It would be advisable to make the magnet removable, as if kept in that position without a keeper, it will become demagnetised. To do this, it is advisable to secure the magnet in position by means of small stops at each end. When arranged for projection upon the screen, it will appear as in Fig. III. By revolving the disc the freely-suspended needle will take up its position according to the angle which the magnet makes with the earth. The needle can be made from a piece of common watch-spring, and magnetised by any of the usual methods.

A very simple arrangement, such as is shewn in Fig. IV., enables us to dispense with the ordinary horizontal needle. A piece of watch-spring is magnetised, and placed upon a narrow strip of cork, and cemented to it if necessary. To each end is attached a cut out letter N S to their respective ends. A circular horizontal tank is placed upon the vertical attachment of the lantern and half filled with water. The mounted magnet is then floated upon the water and focussed upon the screen. By bringing a magnet or piece of magnetic substance close to the poles of the floating magnet—the usual experiments illustrating repulsion and attraction—the letters N and S will readily show upon the screen which end of the magnet is being repulsed or attracted according to the experiment in hand. When a piece of watch-spring and cork are not available a common sewing needle can be magnetised, and, if gently dropped flat upon the surface of the water, it will be found that the strength of the surface film is sufficient to support the needle upon the water and give it freedom of motion. The needle must be perfectly dry, otherwise we shall meet with failure in our experiment.

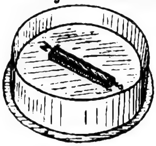
Fig. IV.

Quite a number of pieces of apparatus have been devised from time to time to show by the aid of the lantern the strength of an electric current. Fig. V. is a sketch of one such as that used by Prof. J. A. Fleming to illustrate a lecture that he delivered to practical workers in electricity. The parts are very simple, and could easily be made by anyone capable of using his tools, and possessing a small knowledge of electricity. A hollow bobbin wound with a coil of silk-covered copper wire is mounted upon a wooden frame-work with a well-shaped opening cut out, and the sides formed of two lantern plate cover glasses. A short piece of soft iron with an aluminium pointer attached is supported on an axis. The axis lies just outside the opening of the hollow bobbin, and the soft iron needle lying inside the bobbin, as shown by the dotted lines in the figure. The pointer when in its normal position rests obliquely in the coil. Upon passing a current of electricity through the coil of wire by connecting up by means of the binding screws to the source of electricity to be tested, the needle or projecting end in the bobbin tends to take up a direction in a line with the axis of the bobbin and the extent to which it is able to do this by overcoming the weight of the pointer, illustrates the strength of the current passing through the coil. Graduations made upon the glass sides to the well-opening show the extent of movement of the pointer. The piece of apparatus can be placed in the lantern as an ordinary old wood-framed side.

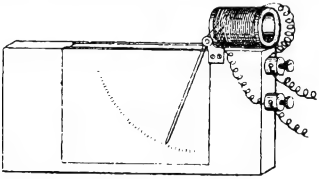
Fig. V.

The mechanism of the pocket-watch was the subject of an interesting lecture delivered by H. E. Duncan, December 7th, 1894, before the members of the Franklin Institute. Throughout the lecture the lantern was used to illustrate upon the screen the various pieces of mechanism that are contained in the watch. This is a subject that could well be more taken up in this country, and by the aid of the lantern be made to stimulate interest in the subject, both from a practical point of view both as regards the modern construction of the watch, and also of older types of watches exhibited in our museums. In cases where the lantern in some form or other could not be used to show the actual parts of the mechanism, either in motion or stationary, lantern slides could take its place.

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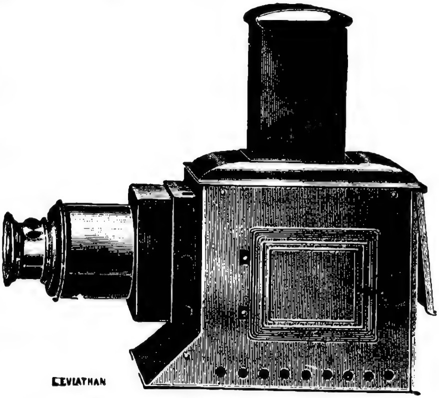

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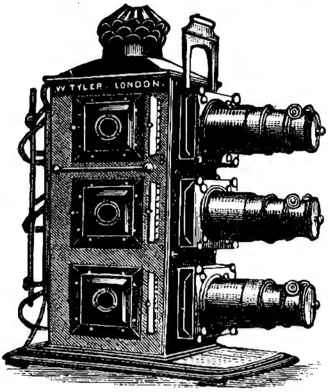
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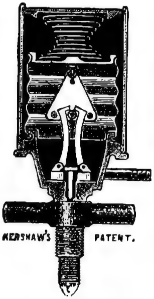

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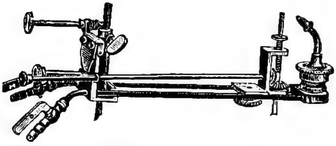

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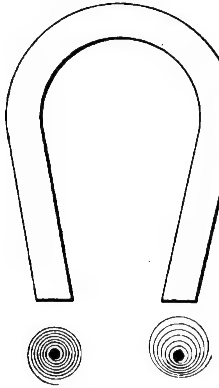
A point in the construction of what are now turned magnetic watches was clearly shewn upon the screen as illustrated in the accompanying diagram, which is from the Journal of the Franklin Institute. Two hair-springs are supported below the poles of a horse-shoe magnet. One is made of a non-magnetic metal and the other of magnetic steel. In the case of the non-magnetic metal, the shape remains unaltered, but in the case of the magnetic hair-spring it is drawn towards the attracting pole, and distorted. A simple experiment such as this would be quite indiscernible if seen from the lecture-table, but by means of the lantern the phenomena may be clearly seen by all present.



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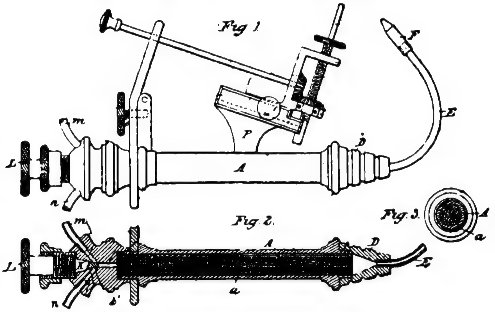
A Safety Jet of 1832 and 1895.

Those who were active lanternists about sixty years ago, will doubtless recollect that Mr. J. Hemming introduced about that time what was termed a safety mixed jet, in which it was found to be an impossibility for the gases to fire back under the most severe conditions imposed at a meeting of one of the scientific societies of London. In Mr. W. H. Harrison's article on the *Birth of the Limelight* which appeared in our August number, he gives a description of this jet which consisted of a brass cylinder filled with equal lengths of brass wire, so fine that it took between four and five thousand to fill the cylinder although it was only of one inch in diameter. It had been found out that if a larger diameter of wire were used, there would under certain conditions be a chance of the flame receding through them, consequently in making them it was necessary to copy with great exactitude the original one of the inventor. For a long time they were well-made and enjoyed great favour, but by degrees certain makers introduced what they thought improvements, which certainly cheapened the making of them, and this was carried to such an extent that it was eventually almost an impossibility to obtain them made in thoroughly reliable style, so they ultimately fell into disfavour.

History, however, often repeats itself, and once again we are likely to have a somewhat similar kind of jet upon the market, for Mr. Thomas Goodwin an enthusiastic lanternist of Rugby has obtained a patent for a jet with a packed tube. In the accompanying drawings it will be seen that this jet is constructed on good principles. The tube (A) is closely filled with thin wire (*a*), at the two tubes (M) and (N) which are provided with taps (not shown) the oxygen and hydrogen are respectively admitted, the said supplies being further controlled by the screw down tap (L); when this tap is screwed down the plug (K) closes the oxygen side altogether, but it being provided with a small slot (K 1), sufficient hydrogen is allowed to pass to serve as a bye-pass. The gas after passing through (A) is collected at (D), and is conducted *via* (E) to the nipple (F.) The holder for the lime which is mounted on (P) is set at an angle of seventy degrees from the stuffed portion of the jet tube.



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Colouring Lantern Slides.—No. 1.

By A. W. S.

The art of painting in transparent colours is an attractive one to persons who possess patience and taste in the arrangement of tints. When the outline and shading of a picture have been already done by photographic means, the application of a few washes of colour will frequently enhance the beauty of the picture considerably, although the work may only occupy a few minutes.

The superiority of coloured pictures over plain photographs as a means of entertaining the general public in a lantern exhibition is admitted by all lanternists of experience. Even the finest uncoloured slides become monotonous to an audience after a score or so have been exhibited, while the varying effects of colour producible in the skies of landscapes, and in the details of most pictures, impart a charm which is always appreciated.

Slide painting in its higher branches requires great skill and experience; there are trade secrets in the business, by which special colours are produced, and certain effects obtained, which to a beginner seem to defy attempts to imitate them; in short, the art presents special technical difficulties, with which I propose to deal. The simple tinting of a good photographic slide is not difficult, provided that the proper materials are at hand, and the right method is adopted.

There are two systems of colouring slides; oil and varnish colours may be used, or we can employ water-colours. Professional slide-painters generally use varnish colours, and there is no doubt that these are the best, because they are the most durable. Water-colours are capable of fine effects, but they should be always protected by a coat of varnish. The heat of a powerful limelight, such as would be used in a first-class exhibition, is considerable, and only varnish colours will stand the ordeal without detriment. Brilliant tints can also be produced by dyes, and gelatine slides may be coloured by simply staining the film; but this is the lowest class of colouring, and no lanternist of experience would buy such slides, for they are sure to deteriorate if often shown by limelight. Some dyes are much more durable than others, but the safest plan is to avoid their use as much as possible.

Varnish colours are pigments mixed with a varnish; oil colours are the same pigments ground in a slow-drying oil. For lantern slides there is no doubt that varnish colours are the best; they dry quickly, and are more transparent. Varnish colours can be obtained from lantern opticians and from slide painters. If these are not obtainable the ordinary artist's oil colours may be employed.

There are some transparent colours included in the series of oil paints sold by a few firms which are valuable to slide painters, and a few remarks upon these may be useful.

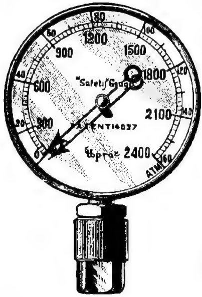
Prussian Blue.—This is invaluable for skies and all stippled tints. It is perfectly transparent, rich in colour, and remarkable for its intensity, a very thin layer of the pigment producing a powerful colour. This property of intensity renders it easy to produce tints even of any depth by the tapping action of the finger tip, called "dabbing," which spreads the colour over the glass in a layer so even and smooth as to be comparable with stained glass. Prussian blue has a slight greenish tint, especially when viewed by artificial light; this may be corrected by adding a trace of crimson lake, mauve, or French ultramarine. For moonlight skies a little burnt umber or lampblack is frequently added; while for evening effects, just after sunset, the colour can be used pure. Good purples and violets may be obtained by mixing Prussian blue with mauve, crimson lake, or pink madder; brilliant greens by uniting it with any of the yellows; and sober greens by combining it with burnt sienna and the brown pigments. In short, Prussian blue is an indispensable colour to the slide painter; it dries quickly if mixed with mastic varnish or other suitable medium.

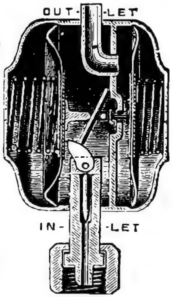
Antwerp Blue is equivalent to Prussian blue, diluted with magilp; it has no special advantages, and although an excellent colour in itself, yet with Prussian blue at our service, it is practically useless to the slide artist.

French Ultramarine.—This blue is quite transparent and free from any green tinge, even when viewed by oil-light. It is useful for making purples by mixture with pink colours; it has little intensity, dries rather slowly, and is better adapted for brushwork than for dabbing.

Crimson Lake.—This colour is the best red available to the slide artist, but it is not so perfect as might be wished. It has little intensity, and is capable only of comparatively pale tints in the dabbing process; deeper tints can be produced with the brush, but owing to a slight translucency of the pigment the colour is apt to looker darker on the screen than it appears on the slide. However, some crimsons are much more transparent than others, and if prepared in varnish instead of oil, satisfactory results can be obtained. Crimson lake in oil dries slowly. A good scarlet is obtainable by mixing crimson lake with gamboge; and flesh tints by adding it to burn sienna and the brown pigments.

Madder Lake and Rose Madder.—Madder lake or pink madder is very similar in tint to rose madder. They are beautiful colours, permanent and perfectly transparent, and give brighter reds on the screen than crimson lake. Being very weak in colouring power, they are useless for dabbing. It is necessary to pile on the paint with the brush before any approach to a deep red is obtained. Prepared in oil, they require weeks to dry, unless a drying oven is





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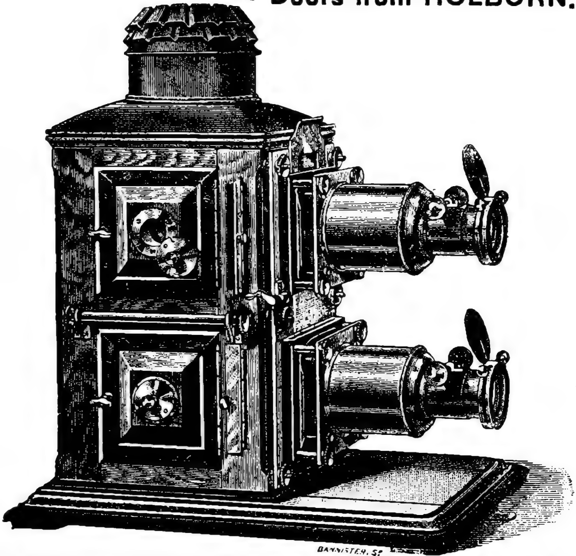

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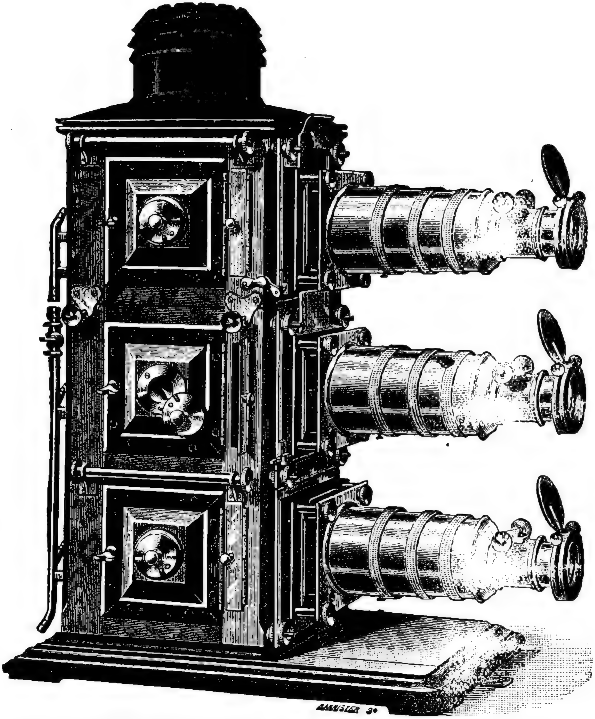

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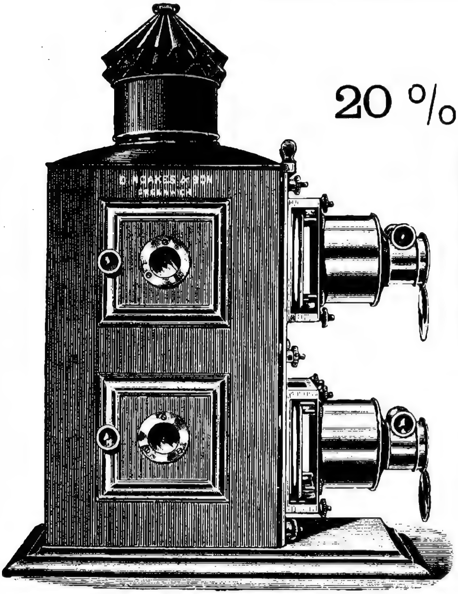

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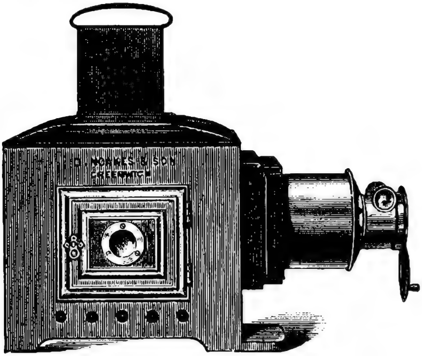

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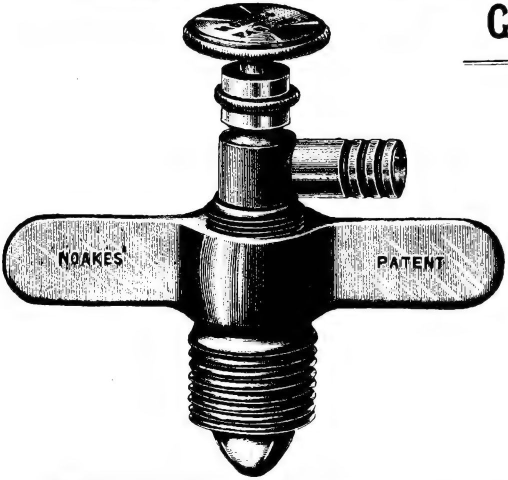

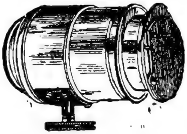

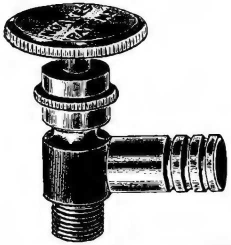

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used; but in varnish they dry quicker and are more intense. They are expensive colours, and are not much used on this account.

Flesh. — This is a perfectly transparent brownish red, sold in bottles by dealers in varnish colours. It is not a dye, but is of the nature of a varnish, and can be had either quick or slow drying.

Gamboge.—A bright yellow, giving excellent greens when combined with Prussian blue. It has little intensity, and if prepared in oil, is very slow in drying. Gamboge varnish can, however, be obtained, which will dry as quickly as mastic varnish.

Italian Pink.—A bright yellow, more intense than gamboge, and therefore better for dabbing. Prepared in oil in the usual collapsible tubes, it is very slow in drying, many days being required, if not assisted by the application of heat. It is chiefly with weak colours, such as the yellows, that the advantage of varnish colours over oil paints becomes conspicuous.

Yellow Lake.—This is similar to Italian pink, but it has a slight brown tinge. It is moderately intense, and pale tints can be dabbed with it; it is rather slow in drying. The yellows are all perfectly transparent, but owing to the colour of artificial light being yellow or orange as compared with daylight, they usually appear very pale on the screen.

Burnt Sienna.—A rich orange brown, fairly intense, and well adapted for dabbing; it also dries well. There are different qualities of this pigment in the market, some being more transparent than others; but none are perfectly transparent, and hence the colour usually appears a little darker on the screen than on the slide. It is the most useful brown for the slide painter.

Burnt Umber.—This is a darker brown than burnt sienna, and is intense, dabbing easily, and drying quickly. It is not perfectly transparent, though there is little loss of richness in pale washes of the colour. It is chiefly in the deeper tints that this defect shows itself.

Asphaltum.—A perfectly transparent brown, not very intense. It is of the nature of a varnish, being made by dissolving asphaltum in oil or varnish. It is, however, not so useful as the two preceding colours.

Caledonian Brown Mummy and Vandyke Brown are other browns. Mummy is quite transparent, of a yellowish tint; Caledonian brown is fairly transparent; and Vandyke brown is rich in colour, but loses considerably in richness when shown on the screen, owing to want of transparency. Practically, these three colours can be dispensed with.

Mauve.—This is a useful colour, as it gives us the brightest violets procurable. The tint may be modified by adding other colours, such as blues and pinks. It is sold in collapsible tubes, also in bottles as a varnish colour. It is quite transparent, and sufficiently intense for dabbing, and is useful in skies and cast shadows.

Verdigris is a rich green, fairly transparent, and very useful for grass, foliage, etc. The tint may be modified by the addition of yellow or burnt sienna. It is not suitable for dabbing.

Ivory Black, Lamp Black, Blue Black are all good intense pigments, capable of being dabbed, and of making excellent greys when diluted with varnish or magilp, and of producing sober tints when mixed with the bright colours. They dry quickly, especially when mixed with mastic varnish.

Varnishes.—Oil colours require the addition of some suitable medium or varnish, in order to render them transparent. For slide painting, a good varnish should be free from colour; when dry, the film should have a flat glassy surface, and be hard and tough, and not liable to soften much when heated. It should be of such a consistence that dabbing is possible, with or without the addition of colours; while it should also dry in a moderate time; and when dry, it should not soften if a subsequent layer of varnish is applied. Such a varnish, made by careful mixture of several ingredients, can be obtained from the writer under the name of Special Varnish; it dries hard in fifteen minutes with the aid of heat. The varnishes obtainable at the artist's dealers may also be employed, and a short description of their qualities may be useful.

Mastic Varnish.—This is one of the most colourless of varnishes made by dissolving mastic gum in turpentine; the gum dissolves very slowly. When applied to glass with the brush, it soon sets and becomes too hard for dabbing; this may be cured by adding a little magilp. Mastic gum when heated becomes soft and almost liquid.

Copal Varnish.—This is not so colourless as mastic, but is cheaper, leaves a thicker film, and will do for comic slips and the like.

Magilp.—This is a transparent, jelly-like substance, sold in collapsible tubes, and is said to be a mixture of mastic and drying oil. Magilp dries very slowly; but when it is dry it does not soften with heat, and is not liable to disturbance when subsequent work is applied. However, many days are required before magilp becomes thoroughly hard, but as with other varnishes, drying may be hastened by heat.

Canada Balsam.—A transparent cement, which may be thinned with turpentine, and used as a varnish. It is apt to leave a very sticky film, to which dust adheres, and it takes a long time to dry hard normally. When dry it will be found, on warming the glass, that the balsam becomes quite liquid again. Hence its use requires judgment.

Japanners' Gold Size.—This has a strong brown colour, and is unsuitable for blues and purples. For other colours, however, it answers well; it leaves a bright surface, dries quickly, and after a few days, the film does not soften again by heat. Linseed, nut, and poppy oils are not of much use in slide-painting, as they dry too slowly, and do not impart the transparence and smooth bright surface desirable. Magilp is perhaps the best substitute when an oily medium is wanted to mix with a quick-drying varnish.

Brushes.—The "brown water-colour sables" are the best for colouring slides, either with varnish or with water-colours. The red sables are stiffer in the hairs. Two or three brushes will suffice; one may be half-an-inch long in the visible portion of the hairs; another may be a size smaller; and one "liner" brush—the hairs about an inch long for painting fine lines—will be useful. The brushes should be fitted on sticks about four inches long; an egg-cup containing turpentine will enable them to be readily cleaned after each tint is applied, the brush being first dipped in the fluid, and then wiped on a cloth. The brush should always be put away clean, with the hairs drawn to a point. If the hairs should become divergent and crooked, they may be corrected by dipping them in hot water, and then stroking the hairs straight with the fingers.

The Palette should be of white porcelain, as wood palettes are useless for transparent colours. A good substitute for a palette may be made by a piece of clear glass about half-plate size, with a half-sheet of white note-paper gummed at the corners of the under side.

The Easel.—A small retouching desk makes a very good easel. The slide is held at an angle of about 45 deg., and a sheet of white paper placed horizontally under the slide will enable the details to be clearly seen. Some artists, especially those who only paint slides occasionally, prefer to dispense with an easel, and hold the slide in the fingers. If this plan is adopted, a box about six inches high may be placed on the table; a sheet of note-paper laid on the box, and the slide with its lower edge resting on this paper, may be held at a suitable angle by the left hand. Of course only the right hand is then at liberty for work, but the slide can be easily laid flat on the paper when cleaning brushes and the like, so that the method is handier than it might at first appear to be.

The Drying Box.—Oil colours take so long to dry upon glass, that a drying box is of considerable value in shortening the time requisite for this operation. In tinting photographic slides, if a little care be used, it is practicable to cover and bind up the slides while the paint is wet, and this plan is a safeguard against dust, and does not prevent the drying, although it may delay it to some extent. But for many subjects, especially where only the outline is provided, it is necessary to divide the work into two or three divisions, called first painting, second painting, etc.; each layer of colour being thoroughly dried and hardened before the subsequent work is put on. In such cases, it is necessary to use heat to assist and complete the drying process. If the artist has a good oven at his disposal, he can use that, resting the slides on wood shelves; a heat equal to that of boiling water will be sufficient. Too much heat will burn the colours and destroy all brilliancy.

If no oven is available, a drying box can be made with the help of a half-plate light-tight photographic wood box, with grooves for twenty-four plates. The sliding lid is removed and a lid of fine wire gauze, about fifty meshes to the inch, stiffened with a wire frame, is fitted instead. A few shelves may be made by cutting some coarse gauze wire, twenty meshes to the inch, into half-plate sizes, which will slide into the grooves. The box is placed on end, with the shelves horizontal, and the gauze lid to the front. One or two pyramid night-lights may be then put inside at the bottom of the box, and the slides which are to be dried are placed on the shelves near the top of the box. There should be two vacant wire gauze shelves between the lights and the lowest slide, to distribute the heat evenly. If an open fire is available, the night-lights need not be used, as sufficient heat may be got by putting the box before the fire at about eight inches distance, with the gauze lid facing the heat. The heat may be increased by placing the box nearer the fire, and reduced by withdrawing it.

Having collected the necessary materials, we may consider the best methods of using them. The application of colours with a brush does not present any great difficulty to a beginner, provided the right medium is used to dilute the pigment. With very small touches of deep

GENERAL WANTS (*continued from page* iii.)

LARGE Lantern, 5 in. condensers, for oxy-hydrogen limelight, with screen, gas cylinders, and over 300 beautifully painted slides. Suitable for public exhibitions or other meetings; very cheap.—Address, Wright, 128, Hope-street, Glasgow.

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BI-UNIAL and Single Lanterns, quantity of slides and accessories for sale, by Tender; list free.—Green, Photographer, Rotherham.

14-INCH Plano convex Compound CONDENSER, in brass (bronzed) mounts; suitable for enlarging from 10×8 negatives downwards; specially made by "Optimus"; cost £24. What offers? As new; not scratched.—Blaker, Studio, Worthing.

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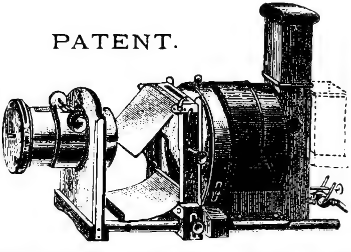

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colour, varnish pigments may be simply mixed with turpentine, as this leaves a thin film after drying. For larger spaces, special varnish may be mixed with the colour, sufficient to make it flow evenly. If subsequent touches of colour are needed, it is advisable to dry the first coat with the aid of heat, before applying the second.

Dabbing and Stippling.—When broad spaces, such as the skies of landscapes, have to be evenly tinted, the colour is roughly brushed over the space, and then a dabber is applied to make the tint even and smooth. This operation is simple enough to an expert, but it seems to be a great stumbling-block to beginners; it is the *pons asinorum* of slide colouring. The great magnifying power of the limelight lantern causes the painted sky of the novice to appear on the screen as if a tornado were blowing, and all sorts of strange and wonderful objects had been spirited up from the ground, and were floating in the air. Then the amateur, after comparing his work with the beautifully even skies produced by professional firms, such as York or Wrench, often concludes that there is some trade secret in the matter, and that it is useless for him to go on. If his bump of perseverance be well developed, he may, however, keep at his task, and after about fifty attempts, find that he is making decided progress, the trade secret consisting mainly of practice, and mixing the pigment with the correct proportion of varnish or magilp.

Some colours are easier to dab than others; Prussian blue is, perhaps, the best of all, as it is so intense that blue tints of any depth can be produced with ease. The blacks are also good for dabbing, ivory black being, perhaps, the best. A mixture of blue and black is useful for night skies. Burnt umber is the best dabbing brown, and burnt sienna is also valuable for warm browns. Crimson lake is the best red, but it can only be dabbed in pale tints. Italian pink is the best yellow, and mauve is good for purple effects in clouds, when modified by other pigments.

The best dabber is the finger-tip, with the nail cut short. The finger to be selected is that which has the softest and smoothest skin; generally the third diget of the right hand is handiest. Ladies have, as a rule, better dabbing fingers than men; rough work is apt to cause the skin to be horny and furrowed. The rubbing of the skin on fine glass-paper may be tried, in order to remove rugosities; but this expedient is of doubtful value, as after a day or two the skin will be rougher than at first. There is no objection to wearing a finger-stall on the dabbing finger, when engaged in other work, as a means of keeping the skin soft.

The finger is pressed gently on the glass, and is held at an angle of 45 deg. for tinting broad spaces, though for working close up to an outline it may be better to hold the finger nearly at a right angle with the slide. The dabbing should be a gentle process, not a violent hammering, tending to roughen the skin, and also to smash the slide. It is sufficient to raise the finger a ¼in. between each touch, and it is best to travel in little circular paths about ½in. in diameter, overlapping each other spiral fashion, giving about six dabs to each circle. Starting at the top of the slide—say, a landscape with sky—we may dab horizontally across it, getting the colour roughly evened, and then by a combination of the spiral with a zig-zag path, gradually approach the horizon. If the colour is too deep, the finger may be wiped occasionally on wash-leather. The horizon of a landscape is generally of a much paler blue than the zenith, the colour gradually deepening as we go upwards. Having made the sky roughly even and of correct depth of colour, we can complete the dabbing by commencing again at the zenith, working with very light touches to make the tint as even as possible, proceeding in horizontal lines backwards and forwards, and approaching the horizon by the zig-zag path as before.

This is the method of dabbing an even tint; it requires practice and, at first, patience. The time spent in dabbing a plain sky may be five or ten minutes with a practised hand; with the beginner it will probably be a lengthy operation.

But practice is not the only requisite, the adjustment of the colour and mediums is equally important. If ordinary oil colour is used, the addition of just enough mastic varnish to cause it to be of a firm consistence without being sticky is useful.

(To be continued.)

—:o:—

Backed Lantern Plates.—No. II.

By S. Dicker.

Continued from page 166.

Last month I dealt with the advisability of backing lantern plates, and promised to give formulæ for that purpose this month, but before doing so I think it will be as well to set forth, in a general way, the cause or primary cause of halation, and why backing a plate to a great extent counteracts or destroys halation.

Without going into the general questions of refraction of light, it may be stated that substances or bodies through which light can pass have certain indices of refraction, that is, that a certain portion of a ray of light having passed through a substance is bent back at the further surface at a certain angle, and thus the back of the plate, in the case of a sensitized plate, acts as a sort of second illuminant or source of illumination, throwing the light back again through the film, but at an angle to the original ray, thus causing the well-known effect of blurring or halation in the film.

Now in order to counteract the tendency of the back of the glass plate to refract the incident rays of light, it is necessary that the glass should be in optical contact with something which will totally absorb these rays, and the various substances which have been proposed from time to time for this purpose rival in number the multitude of toning baths or developers which fill our journals and text books.

However, I do not intend to make this article a history or *resumé* of what has been done and proposed in the way of the prevention of halation during the last 30 years or so, but I will give a few formulæ, so that the reader may select the one he thinks best, easiest or most convenient to use.

Mr. A. Cornu laid it down as a theoretically perfect solution of the problem as to the prevention of halation that a liquid or varnish, having the same index of refraction as the glass, must be used in conjunction with some substance or colour to absorb the rays of light and prevent them from reaching the back of the varnish. For this purpose he recommends the following:—

Essence of cloves	6 parts
,, ,, turpentine ..	1 ,,

to which is added sufficient lampblack so as to form a paste or cream which can be applied to the back of the plate by means of a brush. However, this method is certainly open to the objection of messiness, although it may be a very excellent preventative.

A very good backing, and one which has several points to recommend it, is that employed by T. N. Armstrong. This consists of a solution of asphaltum in benzole or benzole and chloroform. The way I make it is to place some lumps of asphaltum (bitumen) in a wide mouthed bottle or jar provided with an air-tight lid, and pour upon it a few ounces of benzole, letting it stand until all the bitumen that will dissolve, is dissolved; if too thick I add more benzole until the mixture is of a creamy consistency. This is applied to the plate with a brush and dries very quickly, a piece of paper may be placed over it if desired. The backing can be readily removed before development. Ordinary tar will answer the purpose equally as well as the more expensive article. This forms an excellent backing.

The next backing which I wish to mention, and recommend, is the Debenham-Teape caramel method. Here is the formula as given by Mr. Teape:

Caramel	1 ounce
Thick gum solution	1 ,,
Burnt sienna	2 ,,
Methylated spirit	2 ,,

The way I have usually prepared my caramel backing is to buy a little caramel at the grocers (such as is used for making gravies I think), adding to say one ounce, a like quantity of a warm solution of gelatine in water, such as is used for mounting purposes, to this is then added sufficient burnt sienna to make a dark thick cream, and then sufficient methylated spirits is added to render it, when warm, thin enough to apply with a brush; when cold the backing forms a solid jelly. Unfortunately, I do not measure the constituents when making my backing, but I should say if made up according to the Teape formula given above it would be about right. If too thick add methylated spirits. By using as much of the latter as possible, the backing dries very quickly when applied to the plate, and the gelatine prevents the backing from chipping off when dry.

In addition to the above, various commercial preparations of backing liquids might be mentioned, whilst to those who object to the little extra trouble entailed in preparing and applying their own backing, there are several coated backing papers on the market which simply require moistening and squeegeeing on to the back of the sensitized plate. The chief objections to these papers is, perhaps, the liability of failure in obtaining perfect optical contact between the glass plate and the paper, but their cleanliness and ease of application is undoubted. Some years ago flexible tacky backing sheets were put upon the market. The coating was a coloured solution of gelatine rendered tacky, but not exactly sticky, by the addition of glycerine or some similar slow drying substance, so that it was only necessary to place the fabric on the back of a sensitized plate and press it firmly into contact, when it immediately adhered, and would so remain until it was stripped off by hand, when it was ready for further use again.

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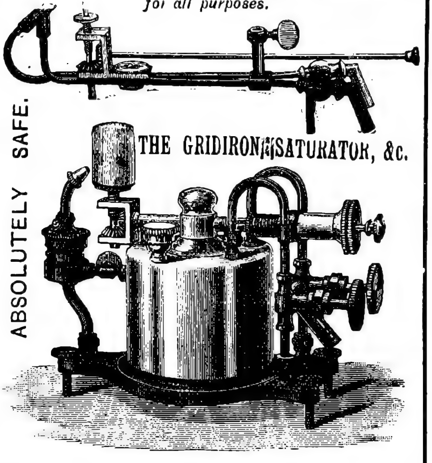
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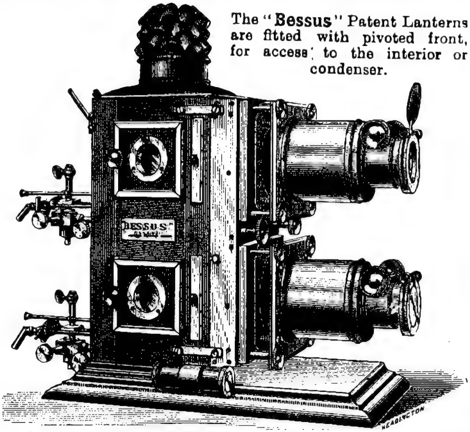

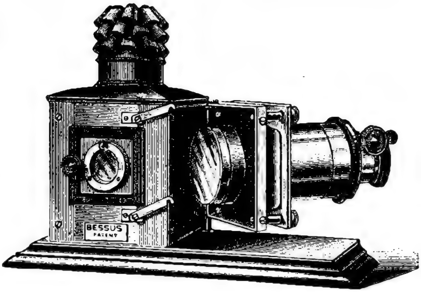

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To facilitate the application of the backing and to prevent any chance of getting the solution on the film side of the plate, I use a little frame made as follows:—I take a sheet of millboard or thin wood about 6 inches square (for lantern slides), and from the centre cut out a square, a trifle over 3¼ inches. Around this opening place four narrow strips of thin metal about ⅜ths of an inch wide, one along each side, so as to overlap the central opening in the board by about ⅛th of an inch or a little more, or instead of using strips I may use a frame in one piece. This frame of strips I secure to the millboard by metal pins or rivets.

The plate to be backed is placed film side down on a sheet of clean paper or cloth and the frame over it, so that the plate just fits into the aperture in the millboard, and the inner edges of the metal frame or strips lie upon the top of the back or glass side of the plate. The backing can now be applied by means of a brush, and the frame removed, when the plate will be found to be backed all over with the exception of a margin of about ⅛th of an inch all round. If desired, a piece of tissue paper may be laid on to complete the operation, but this is not necessary unless the plate is to be used immediately.

How Russian Iron is Made.

By a Manufacturer.

Russian iron lanterns form a prominent feature in all lantern catalogues, and there are few lanternists who at some period or other have not possessed at least one Russian iron lantern; but I question if more than one per cent. of these users have ever questioned what is Russian iron? As a return for the valuable information that I have received since 1889 from the practical articles in the Optical Magic Lantern Journal, I hope the following will be of benefit to its readers. In this age of seeking after knowledge, it in my opinion becomes all readers who have any information to impart, to give his fellow readers the benefit of it, and when one gets too prosy the editor will cut it short, perhaps after the fashion of the portion of the article which appeared in the August number, headed "Art in relation to Lantern Slides"; but to the point.

By the majority of the public, the making of sheet Russian iron is considered as a trade secret, possibly because it is seldom described in works pertaining to the manufacture of iron. It is in reality not a difficult thing to make when once one knows how, although I do not for one moment suppose that readers will make their own—they will buy it cheaper.

The best ores are obtained from the chain of mountains separating East Russia and Siberia. By a process too long here to describe, malleable iron is made from the ores to billets, these in turn are rolled into bars of a little over two feet long, half a foot wide, and less than half an inch thick. After rendering these bars red hot they are subjected to a rolling process until they form sheets between two and three feet square, they being afterwards rolled together in batches. Again and again these sheets are made red hot and piled together, powdered charcoal being sprinkled between each and rolled until they assume the proportion of about two feet by four feet.

After this, each sheet is carefully washed with water and again sprinkled over with fine charcoal, then bound up in packets of about seventy or eighty sheets and placed for the greater portion of a day in an annealing chamber.

Each packet is now subjected to the action of a heavy steam hammer, under which the packet is moved so that the blows are evenly distributed. The sheets are then separated, and after being washed and heated are again subjected to the hammer. After this they are again heated and piled up alternately between cold sheets and hammered as before. Ere the sheets get cold, they are again washed and racked away to cool when the edges are trimmed so as to bring them to standard size, and in this style they are supplied to the manufacturers of lanterns and the hundreds of other articles which are made from this excellent material.

A New Method of Making Oxygen Gas.

Communicated by Vigilant.

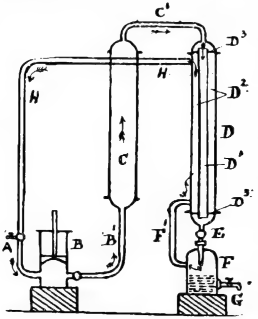
A short time ago a paper by Dr. C. Linde was read at a meeting of the German Engineers, describing a novel method of obtaining oxygen gas from common air. Heretofore the usual method adopted has been a chemical one, advantage being taken of the affinity of one of the constituents—oxygen—of common air for certain substances such as barium oxide, sodium manganate, calcium plumbate, sulphuric acid, and other substances, and the well-known chlorate of potash and manganese dioxide process.

Also, the production of oxygen has been attempted by decomposition of water by means of electricity; by adding water to a mixture of powdered potassium ferricyanide and barium dioxide; by taking advantage of the different rates at which the constituents of common air —oxygen and nitrogen—penetrate a rubber membrane or diaphragm, and by other chemical and physical means, but with one or two exceptions none have met with any considerable amount of success, and, although it is estimated that not less than one-third, and possibly as much as one-half of the total weight of our earth consists of oxygen, and that it forms about one-fifth the weight of our atmosphere, it is still obtained in a pure state—or practically pure state—only by the use of elaborate plant and at great expense.

Whether Dr. Linde's process is going to make any great difference is at present uncertain, as it has scarcely gone beyond the experimental stage, and it would be unfair either to unduly praise or discredit it before further trials and experiments have been made.

To describe the process adopted by Dr. Linde in a few words the following explanation will suffice:—Common air is compressed and passed through a cooling chamber, thence through a pipe or other conduit into another cooling chamber, through an ordinary throttle valve, and back in the reverse direction through the second cooler, and thence to the compressor; this cycle of operations being continued until the air has so cooled itself that it begins to liquify into a receiver, a further supply of air being fed into the compressor to make up for the liquid air retained in the receiver.

The following diagram will perhaps better explain the operation, although, of course, the actual apparatus is not quite so simple, and it has to be thoroughly insulated in order to prevent absorption of heat from the surrounding atmosphere:—The air enters the apparatus by the valve or tap (A), thence passes in the direction of the arrow into the compressor (B), from whence it passes into an ordinary water jacketted cooling chamber (C), it then passes along the top pipe (C^1), down the centre of another cooling chamber (D), through the pipe (D^1), which is kept separated from the outer part by means of the metal rings (D^3). From this second cooling chamber the air is forced through the throttle valve (E), becoming cooler as it expands, in accordance with the well-known law enunciated by Joule and Thomson many years ago. In this way it was found that air which at first was at a temperature of 50° F. became cooled down to 10° F. on leaving the throttle valve. The cooled air then starts back by the tube (F^1)—to cool the air which is following it down the second cooler—into the outer part (D^2) of the second cooler, where it acts as a cold jacket, and takes up some of the heat from the compressed air in the inner tube (D^1), thus cooling it. By the time the air which has passed the throttle valve.—(E) reaches the top of the second cooler on its return journey, it has absorbed so much of the heat of the air passing down the inner tube (D^1) that these are both of the same temperature. This air then passes on by the pipe (H) into the compressor, to again go through the above-described cycle of operations of compression, expansion, and consequent cooling until the temperature of the air, after it issues from the throttle valve into the receiver (its coldest point), becomes lower than the critical temperature of air, and thereupon a portion of it becomes liquid, and falls to the bottom of the receiver (F). A further supply of air is admitted when necessary by the valve (A) to compensate for the amount liquified.



A, air inlet; B, compressor; B^1, pipe to 1st cooler; C, 1st cooler; C^1, pipe to 2nd cooler; D, 2nd cooler; D^1, inner tube of 2nd cooler; D^2, outer passage of 2nd cooler; D^3, separating rings; E, throttle valve; F, receiver; G, receiver tap; F^1, return pipe to 2nd cooler; H, return pipe from 2nd cooler to compressor.

The pressures at which it has been found best to work are 150 atmospheres for the compressed air before it passes the throttle valve, and 50 atmospheres when it has passed the throttle valve. By this means liquid air is produced. It is now necessary to separate its constituents of nitrogen and oxygen. This is to a certain extent easily done by taking advantage of the fact that nitrogen boils off from liquid air more quickly than oxygen. By this means oxygen of a purity of 70 per cent. has been obtained. It is possible that the inventor's object at the time of the experiments was not to obtain the purest oxygen possible by this pro-

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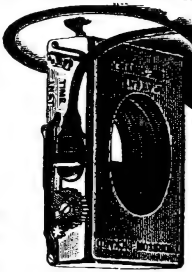

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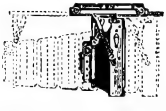

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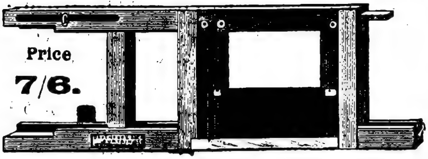

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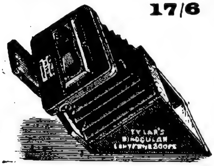

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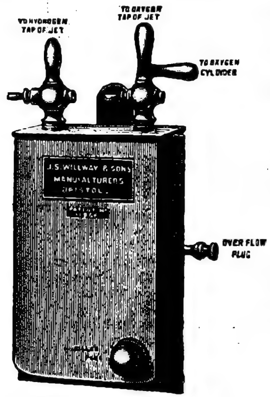
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cess, as by allowing the "boiling off" to go on longer, whilst a certain amount of oxygen would probably be lost, a purer gas would no doubt be obtained, and it must also be remembered that this work was not much more than experimental, and doubtless improvements in the process are certain to be made.

At all events, it will be interesting to follow the developments of this method, which for many purposes seems very promising, though whether it will ever affect the lantern trade is as yet uncertain.

——:o:——

On Setting up a Lantern.

By The Showman.

It not unfrequently happens that one goes to a lantern lecture or exhibition, and finds the lantern good, the screen good, the slides passable, and the operator tolerably well up to his work. Yet this happy combination is to a great extent marred by the want of proper and adequate means for placing the lantern in position.

Over twenty years ago, the writer remembers reading in a manual on the subject of the optical lantern, which was probably the only work of the kind at that date, in allusion to the oil-lit instrument now known as "the old-fashioned phantasmagoria lantern":—"The lantern may be conveniently placed upon its own box, raised upon a small deal table, such as is usually supplied for a servant's bedroom." This is an excellent method to adopt with a single lantern in private; but when applied to public halls or schoolrooms, is likely to be found considerably at a discount. The operator who leaves everything to chance, as it is a pity so many do—on being landed at a hall will generally ask for a table, and will be taken by the hall-keeper to inspect the only available sample of the article on the premises. This will very likely be either too large, too heavy to move, or a small, rickety, unsafe affair on one or three legs, or an expensive leather-covered office table, which it is forbidden to use under any circumstances. So the disappointed operator, after wasting some time in a vain search, sets to work to build an erection for his lantern consisting of chairs, orange, soap, and mustard boxes, on the top of which he perches his lantern, only to find that the foundation is far too unstable to be in any sense satisfactory. Or it may happen that at a schoolroom, though tables are rare, desks are plentiful, and one of the latter is requisitioned, the difficulty of the sloping top being got over by the use of a black-board, or a series of slates, packed up to the required height on the lower side by books. In either case it is generally touch and go with the whole thing, the betting being fairly long odds against the evening being got through without mishap.

A striking instance of the unsafeness of these make-shift arrangements came under the writer's notice last season. The lantern was set up on a small table, which was placed upon a somewhat larger one, the latter being provided with flaps, one of which was turned up, the operator standing on the lower table. The evening went off successfully, but when commencing to pack up, the operator carelessly placed his foot upon the overhanging flap, and rested the greater part of his weight upon it. Immediately the whole concern began to tilt, and had it not been caught by a bystander, and restored to a vertical position, there would have been such a crash and such a smash as that room had never before seen.

Even when the operator is lucky enough to find a suitable table for his lantern, he generally finds another one necessary for his slides, and as this is generally unobtainable, he can rarely be said to work under comfortable conditions. A lanternist who has experienced the foregoing difficulties two or three times, has generally had enough of them, and begins to ponder over what can be done to eliminate them. At the outset he will perceive that as he cannot obtain for the asking, suitable apparatus wherever he goes, it follows that such must form part of his own outfit, and as manufacturing opticians have not given this point much attention, ample scope will be found under this head for the exercise of individual genius.

In "The Book of the Lantern," Mr. Hepworth goes to some length to describe his system of attaching four iron legs to the bottom of a bi-unial case, and concludes by telling us that their combined weight is fourteen pounds. Most lanternists will no doubt conclude that this is too great a weight to add to the outfit for the single purpose for which they are intended, although such legs properly fitted to their sockets will afford the very greatest rigidity.

Manufactured stands comprise a large variety of tripods, some elevating cases, and one or two arrangements of boxes and cabinets. A tripod stand is generally more or less objectionable, owing to the ease with which it can be disturbed or upset altogether, the necessity for the operator to keep clear of the legs in the dark, and the want of accommodation for the slides, etc. Cabinets which are arranged to contain the whole apparatus are often too heavy when packed, and elevating cases are very much weaker for travelling purposes than solid ones.

The best plan is to do away with extraneous appliances altogether, and to let the various cases in which the apparatus packs form the stand—and this problem presents little or no difficulty in the case of bi-unial and tri-unial lanterns.

Assuming that the lanternist uses a cylinder or cylinders, and carries these unpacked, or merely in wooden shells, his outfit besides will necessitate at least two boxes, one containing the lantern itself, the other the screen, slides, limes, pulleys, cord, tools, and that host of other trifles, without which no outfit is complete.

Now when both boxes have been unpacked, place the lantern case at the bottom, and the other box on the top. Then the lantern can be lifted on to the pair. The upper box should be made with a hinged lid, and placed upon its side, so that the lid will not only fall outwards towards the operator, but fold down flat against the side of the lantern case. The interior will then form a convenient cupboard, in which the slides, lime box, tongs, cylinder key, matches, and so on, can be laid out so as to be at hand when wanted, with the additional advantage that if the lantern has to be left unattended, the box can be closed and locked without disturbing anything in the least.

It is quite possible that a third box will be found necessary in the case of a triple lantern, and this should, if possible, be made fairly tall and narrow, so that when laid on its side it will form a good stand for the operator. The height of a triple lantern above the floor should, if possible, be such with relation to the audience, that the rays from the lowest nozzle should not be obstructed by a person standing on the floor immediately in front; and with relation to the operator, such that it is neither necessary for him to stoop to look at the lowest jet, or stretch his neck to see the highest one.

A similar arrangement to the one sketched out for a triple lantern will suffice for a bi-unial, if the outfit is divided into three boxes. If not, a small folding stand will be required, even though the operator stands upon the floor, on account of a bi-unial box being shorter than one for a triple lantern.

In the case of a small light bi-unial, a handy method of making the box, so as to convert it into a cupboard when required, is shown in section in Fig. I., and in side elevation in Fig. II. The top of the box is hinged at one end, and lifts up to allow the withdrawal of the lantern. Next the pins (A A) are withdrawn, and part of the side (B) falls inwards until it rests upon the ledge (C), where a bolt or button (D) holds it in position against tilting. This panel turns on the pivots (E E). Then a button (F) is turned under the lid (G), so as to release a small hinged frame (H), the opposite end of which is dropped into a suitable notch in the rows (K K). The rigidity of the side is maintained by the fixed piece (L).

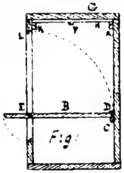

Fig 1

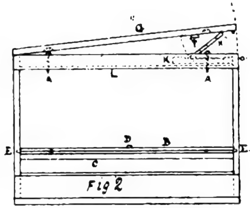

Fig 2

The setting up of a single lantern is altogether a question of taste, and to what extent the system now described can be worked in, depends upon the number and size of boxes the operator finds necessary to pack up into, the great object being to make the stand rigid. reliable, self-contained, and easily put up and taken down. Chairs of the usual pattern do not lend themselves to forming any part of a stand conveniently, as, apart from the fact that few chairs stand fairly on the four legs, the backs and seats are formed of a variety of curves and hollows, both for ornament, and to suit the human anatomy.

The careful reader has noticed that in the foregoing arrangement of a triple lantern, nothing was said as to tilting, and that as a triple case is usually fitted with a tilting-board on the top, the result would be that not only the lantern, but the upper box and all its contents would be tilted, inconveniently so, perhaps. Do not, then, use a tilting-board at all, for, in the first place, the tilting-board doubles the top of the case, and so adds weight, (a very undesirable thing), and secondly, the tilting-screws, though very nice to look at, and giving a beautiful adjustment, take time to screw up, and more time, which can ill be spared, perhaps, to unscrew after the show.

So discard the tilting board, and make a V piece of two strips of wood, the length of which is equal to the width of the lantern foot. Fig. III. shows clearly what is required. In use place the thickness (A) under the lantern foot at the front end. If this is not sufficient, try the

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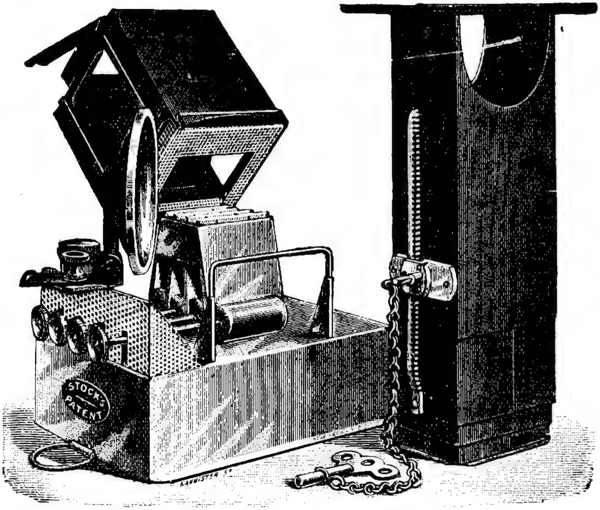

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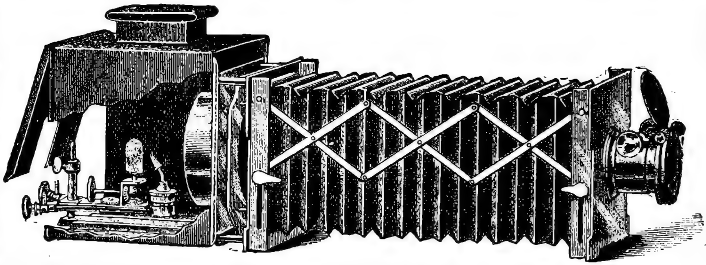
PRICE £9 9s. 0d.



PRICE £9 9s. 0d.

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Size 6⅓ × 6¾ × 7 inches. Price complete, with three different foci, front lenses, and best oxy-hydrogen mixed gas jet, **£9 9s. 0d.** Can be purchased from all dealers.

RILEY BROTHERS,

55 and 57, GODWIN STREET, BRADFORD, ENGLAND,
and 16, BEEKMAN STREET, NEW YORK, U.S.A.

Having Branches in Boston, Chicago, Chattanooga, Kansas City, Portland and San Francisco, we are prepared to prove that we are

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SUPPLY OUR CUSTOMERS WITH THE BEST GOODS

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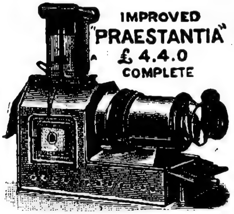


Our "PRAESTANTIA" Lantern at £4 4s.

(fitted for Oil) is acknowledged by hundreds to be the BEST, BRIGHTEST and CHEAPEST LANTERN in the WORLD.

Or if fitted for OIL and LIMELIGHT £4 15s.

Fitted with LAWSON SATURATOR £5 10s.

We have sold more of this Lantern than can be proved of any other Lantern in the world, and have thousands of testimonials to its worth from every part of the globe.

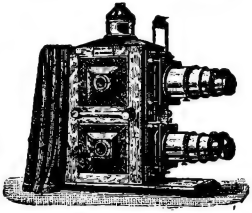
OUR "MONARCH" ETHOPTICON BI-UNIAL £22

FITTED WITH THE LAWSON PATENT SATURATOR IS A MODEL OF SIMPLICITY IN WORKING. ABSOLUTELY SAFE.

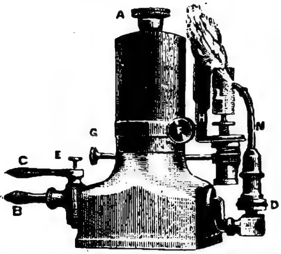
GREAT IMPROVEMENT THIS SEASON. BEST AND BRIGHTEST IN EXISTENCE.

This Lantern fitted with best H.P. Jets **£21 10s.**

Other cheaper Lanterns can be offered. These are the best



LAWSON'S PATENT SATURATORS.

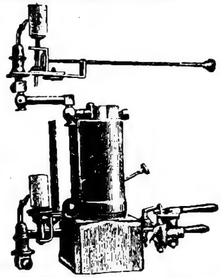


AWARDED PRIZE MEDAL AND DIPLOMA
CHICAGO EXHIBITION, 1893.

Simple! Safe! Economical!
Powerful! Cheap!

British Patent, Nos. 20,628 and 17,816. American Patent No. 478,135.

More than **ONE THOUSAND** of these Saturators are now in use. Never an accident been reported.



FOR SINGLE LANTERNS. Price 50s. **FOR BI-UNIAL LANTERNS. Price 80s.**

Great improvements introduced this season. They are so simple a child can work them. So safe that an accident cannot be conceived with them. So powerful that customers are astonished with them. Cheapest form of Limelight in existence, and most efficient; only one Cylinder required (oxygen). Lanterns and outfits sold on our monthly payment system. We have the Largest Slide Hiring Department in the world and the most efficient.

50 Slides Loaned for 3s. Send for Large Catalogue and Supplement (preparing) 6d. Operator's and Buyer's Guides 1½d. each. Hire Lists Free.

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thickness (B), then place the tilter so that (C) is uppermost, and for further heights with (D) or (E) at the top. In the case of the last three positions, almost any angle may be obtained by pushing the tilter bodily towards the body of the lantern. A bi-unial or tri-unial is generally heavy enough to remain firmly where it is placed without being screwed down.

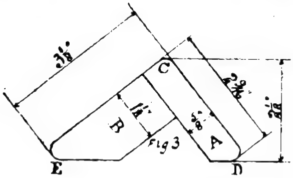


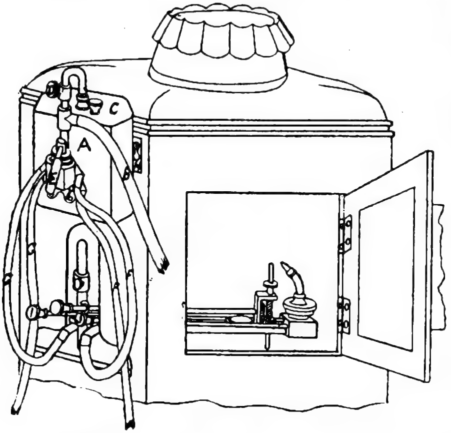
Fig 3

——:o:——

New Apparatus.

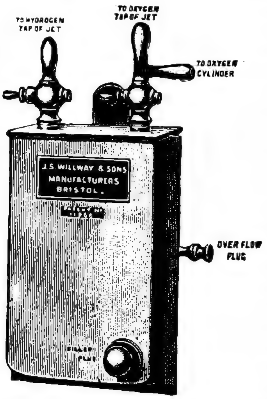
PARVIN SATURATOR.

Mr. Parvin, the inventor of the Gridiron saturator, is about to place upon the market a saturator which he has perfected for use with a special form of jet and a bi-unial lantern. The ordinary mixed chamber jet can be used if desired. This new one is fastened at the back of the lantern towards the top, and a species of dissolving tap forms part of the apparatus, which is rigged up as shown in the drawing; (A) being the saturator, (B) the tube connecting gas bottle and saturator, (C) plug by which the apparatus is charged with ether, (D) tap controlling the quantity of oxygen allowed to pass into saturator, (E) dissolving tap, (F) pipes leading to oxygen sides of jets, (G) pipes to hydrogen sides containing saturated oxygen; (H) shows means of attaching to lantern, (I J) controlling screw valves for jets, which are situated immediately below the chamber of the jet, instead of close to the rod on the tray.



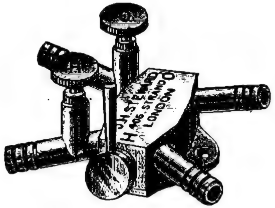
PENDANT SATURATOR.

This new saturator is named from the position it is placed in when using. It is simply hung on a nail or hook at the lower part of the back of the lantern, and connected by rubber tubing to an ordinary mixed jet. In order to charge the apparatus, it is laid on its side, and the large plug on its (then) top unscrewed, also the small overflow plug at the side. Through the former, ether is slowly poured in until it is seen to run out at the small overflow plug. It is then drained by means of this when it is ready for use. Having hung it in place and the connections made to the relative parts shown in the illustration. Should at any time it become necessary to drive off the waste watery fluid from the packing, this can readily be effected by opening tubes and plugs of saturator, and setting it for a while on the top of an oven. We recently received one of these saturators from the manufacturers, Messrs. J. S. Willway & Sons, Drawbridge, Bristol, and found that when used in conjunction with a good jet it behaves in an excellent manner. The apparatus is substantially made and weighs a little over two pounds, and measures $9\frac{1}{2} \times 4\frac{1}{2} \times 2\frac{1}{4}$ inches. In many saturators the question arises, "How long will a charge of ether hold out?" But in this case the matter is settled in a capital manner by the makers certifying them to be equivalent capacity to 20 cubic feet of hydrogen.



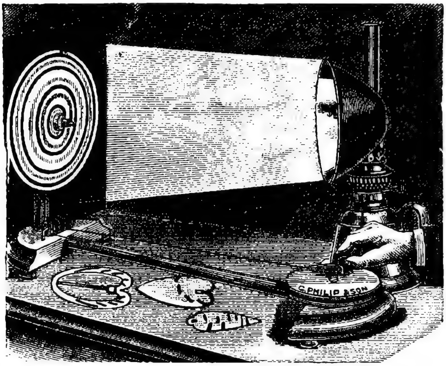
“CUT OFF WITH SCREW-DOWN VALVES.

Many lanternists having jets fitted with the ordinary lever taps, will remember they have had at times a difficulty in getting the “*best*” light, and when they have obtained it, have probably had to leave the lantern and go away for some purpose, which necessitated the light being turned out. In the illustration shown, Mr. Steward, of 406, Strand, has combined a fine adjustment arrangement for both gases, with a cut off, so that the light when once adjusted to give the required light can be lowered to a bead, and raised again to the original light as often as required by simply turning a lever.



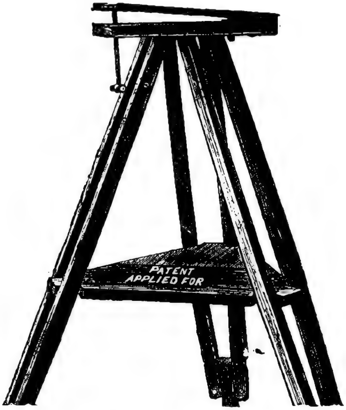
BETTS'S CHROMOSCOPE.

This instrument, which one hardly knows whether to call a toy or a scientific apparatus, has reached us from Messrs. Philip & Son, of Fleet Street. With each outfit are supplied cards of various shapes, marked with segments of circles, as shown lying on the table in the illustration. One or other of these cards is fastened on the frame and rotated by means of a large wheel, as indicated. The various lines on the cards are of deep black, but when they are rotated they assume colours (faint, certainly) such as grey, blue, red, yellow, in various shades, according to whether they are rotated from right to left or from left to right.



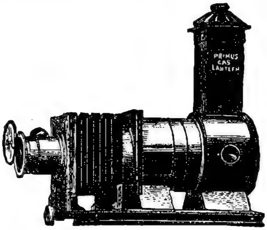
“PRIMUS” LANTERN STAND.

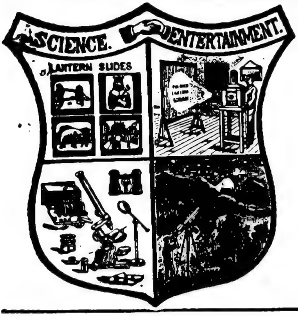
In lantern entertainments a shelf is very desirable, and in the new stand introduced by Messrs. Butcher, of Blackheath, they have arranged not only a folding stand, but a folding shelf; which, when fixed, is absolutely rigid. The ends of the legs fit into the tilting table head. It folds and packs into small compass, and in the language of a certain poet, “it should fill a long-felt want.”



“PRIMUS” GAS LANTERN.

This lantern by the same firm is of small dimensions, and is a pretty instrument with a





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THE GREAT CITY DEPOT FOR
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"MOONLIGHT"
VAPOUR POCKET LAMP
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CHEAP NO OIL!
CLEAN NO DIRT!!
SAFE NO SMELL!!!
INSTANTANEOUS LIGHTING! LASTS FOR EVER!!

Used always by all photographers who have seen it, also used for railway travelling, workshops, household purposes, &c.
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Other Patterns.—Boudoir, Taper, Cycle Lamps, &c. Illustrated catalogues, free to readers of the MAGIC LANTERN, from
Inventors and Sole Manufacturers—
THE MOONLIGHT PATENT LAMP COMPANY,
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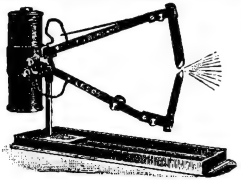
IMPORTANT TO ALL LIME-LIGHT USERS!
BORLAND'S PATENT SCISSORS ARC LAMPS
For DIRECT and ALTERNATING Currents.



Made in Three Types:
Hand Feeding.
Self-Striking & Hand Feeding.
The "**Dot.**" The *only automatic* Arc Lamp in the market which fits all ordinary Optical Lanterns on the lime-light tray without any alterations.
Invaluable for *Theatrical Purposes, Lantern Projections, Enlarging, Printing, and Photographing.*

Prices, Particulars, and Testimonials free on application to
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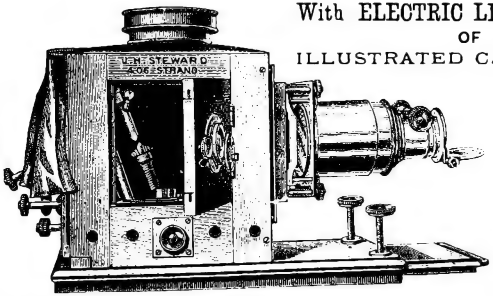
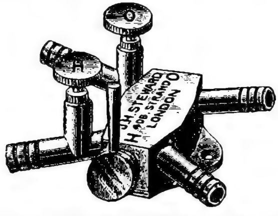
With ELECTRIC LIGHT, LIMELIGHT, or OIL LAMPS
OF BEST CONSTRUCTION.
ILLUSTRATED CATALOGUES GRATIS, Post Free.





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DAVENPORT'S Patent Small Size **ARC LAMP, £4 4s.**
If with all Mechanical Adjustments, £5 10s.
These fit into ORDINARY LANTERNS in place of the OIL LAMP, and can be used on either Direct or Alternating Currents.

First Silver Medal awarded at Royal Cornwall Polytechnic Exhibition, 1895.

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With Fine Adjustment Valves for Regulating Gas to a nicety, **£1 1s.**

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With Latest Improvements.

OIL LANTERNS, 3-WICK LAMPS, 4-INCH CONDENSERS, etc.,
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Marvellously Illustrated.

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UNIVERSAL DISSOLVING CARRIER
(Patent).
On withdrawal of front slide, springs adjust the back one in focus.
Used horizontally, it takes Unframed or Framed Slides. Delivers at one side. *Can be used vertically in open stages.* Price 4s. 6d. Of all Opticians, or of the Manufacturers,
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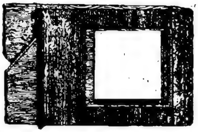
Prospectus Free by Post.



A. HENRY & Co.,
32, Maidstone Street,
HACKNEY ROAD, N.E.
Wholesale Manufacturers of Postal Boxes and Wood Boxes for post and rail.
Strong and well-made. Cheap in price.

SANDS, HUNTER & Co.,
Photographic Apparatus and Lanterns,
NEW AND SECOND HAND, BY ALL THE BEST MAKERS.
Lanterns and Operator let out for evening entertainments for children, &c. Terms Moderate.
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LANTERN SLIDE MAKER. (*Wet Collodion Process only.*)
Slides to illustrate Science and other Lectures made from Customers' own Negatives or Diagrams.
ARTISTIC COLOURING A SPECIALITY.
des made from 9 - per doz.; Coloured, from 6/- per doz.; according to Style and Quantity.

MESSRS. PALETHORPE Ltd., Dudley Port, Staffs.
The renowned Royal Cambridge Sausage Manufacturers, are prepared to loan a set of their slides, illustrating Sausage and Pork Pie making.
The set comprises 26 slides, descriptive reading, and packed in box complete.
Application for same to be made to ALFRED H. SAUNDERS, as above.

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PORTABLE FOLDING LANTERN SCREEN STAND, with Seamless Sheet; complete in Travelling Case; 8 ft., 21s.; 9 ft., 25s. Dozens already sold.
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MR. J. C. STEVENS begs to announce that he holds Sales of the above, every Friday, at half-past twelve precisely, at his great Rooms, 38, King Street, Covent Garden, London.
Gentlemen wishing to include property in these Sales are requested to send particulars one week prior to sale.

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129, WEST STREET, SHEFFIELD,
GIVES THE BEST VALUE IN SCREEN STANDS AND SCREENS.
Eight different styles to select from. Good 9 ft. Stand 15s. 6d.; Ever-ready Slide Boxes; National Reading Lamps; Brass Fittings for Lanterns and Stands.
COMPLETE PRICE LIST FREE. WHOLESALE AND RETAIL

FOR LIMELIGHT EFFECTS
THE DALTON COLD LACQUERS have only to be poured on a clear piece of glass. They dry at once. Can be had in all shades. Transparent. Requires no heat. Used also for Metals.
Can be had in 1s. bottles, pints, quarts, half-gallons, and gallons.
Black Lacquer is admirable for applying cold to metals, &c.
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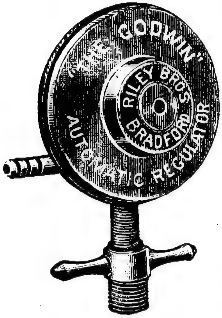
Makers of the Highest Class of Lantern Slides.

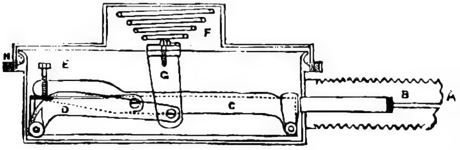
LIST OF NEW SETS SENT, POST FREE, ON DEMAND.

mahogany base, the remainder being constructed of Russian iron and brass. The racking out is done by a screw in front, the final focussing being performed by the lens pinion. The lantern is meant expressly for an incandescent gas burner, and, as the mantles in connection with these have been lately improved, small sized discs can be well illuminated.

GODWIN REGULATOR.



The name of this regulator is evidently obtained from that of the street in which the premises of Messrs. Riley Brothers is situated in Bradford. The circular part, as shown in the illustration, measures four inches in diameter, and it weighs a trifle over two pounds. It is attached to the cylinder at A, the gas passes up the tube B and into the upper portion of this tube at the part where it is of larger diameter a valve rod is fitted, the end of which comes in contact with the end of the lever C. When gas is admitted, a certain quantity passes into the regulator and forces a rubber bellows slightly up into the part F, where a spring serves to force it back again thus giving ample working pressure. As the bellows pushes against the spiral spring, it draws up the portion G which is attached to the end of a short lever D. The end of D which is nearest its fulcrum is attached with a short bar to the far end of the lever C, so that a light movement of D exerts a very great force by means of C on the end of the valve pin spoken of. As soon as the bar G returns to its normal position a little gas is allowed to enter the chamber E, and in this manner a steady pressure is kept up at the jets.



Editorial Table.

Binding Tapes.—Mr. Tylar, of Birmingham, has forwarded to us a sample box of substantial slide-binders. These are of linen tape, coated with a particularly adhesive compound.

Pleasures of a First Pipe.—The set of three slides bearing this title forms a very good story without words. They are from negatives by Mr. Winter, of Derby, and are published by Mr. Tylar, of Birmingham.

"Athletic Sports, Games and Toys," which was dead and is alive again, begins its new career in a healthy sort of way. It is published by Drane, Chant & Co., of Salisbury-square, and is edited by Mr. Whitfield Crofts. The intention is to bring it out monthly at twopence.

:o:

Patent Intelligence.

The following list, relating to current Patent Applications, is compiled expressly for "The Optical Magic Lantern Journal" by a registered Patent Agent. For further information apply to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

No. Recent Patent Applications.

15360. 15th August, 1895. J. L. Willson. Improvements in the production of calcium carbide.

15402. 16th August, 1895. J. H. Exley. Improvements in apparatus for generating acetylene gas.

15714. 21st August, 1895. F. Sternberg. Improvements in, or relating to the production of photographic transparencies or positive pictures.

15991. 26th August, 1895. H. Gabe. Improvements in automatical apparatus for decomposing carbide of calcium.

16070. 27th August, 1895. C. A. Chase. Improved stereopticon panorama apparatus.

18502. 3rd September, 1895. E. Duerelet and L. Léjeune. Improvements in apparatus for use in the production and utilisation of acetylene.

16691. 6th September, 1895. R. Campe. An improved generator for acetylene gas lamps.

17667. 21st September, 1895. F. Fowler. An improved saturator for lime-light apparatus.

17930. 25th September, 1895. W. Friese-Green. Improvements in photographic cameras and magic lanterns.

18753. 7th October, 1895. C. D. Abel (E. Gaumont). Improvements in photographic enlarging apparatus.

Recently-Printed Specifications.

Copies of the following specifications may be obtained by remitting 1/- for each specification to The Patent Department, "Optical Magic Lantern Journal," 56, Chancery Lane, London, W.C.

15643 of 1894. Airs. Optical lantern.

16916 of 1894. Taylor. Lime and electric lights.

13959 of 1895. H. L. A. Lapointe. Manufacture of oxygen.

20095 of 1894. Tomkinson. Magic Lanterns.

13959 of 1895. Lapointe. Oxygen.

Correspondence.

SQUARE LIMES.

To the Editor.

DEAR SIR,—Allow me to suggest a detail as regards limes for lantern work. We lanternists have all been troubled by the hydrogen flame from a blow-through jet curling round the side of the lime, and striking with its intense heat towards one or other of the back top corners of the lantern. This may, of course, be caused by an excess of hydrogen, but it is more likely in the case of competent lantern operators to be due to the flame not striking exactly in the centre of the lime cylinder. In a single lantern, a well made burner if correct at the beginning of the exhibition will remain so. But with a bi-unial, and more especially with a triple, the metal, including the burners, in the upper lantern or lanterns will expand, and, I find, most likely slightly warp. This slight warping very often causes the flame to move from the centre of the lime, and thereby cause the trouble I have already mentioned.

Now, could this not to a certain degree be remedied by using a square lime instead of a round one? Although a cylinder is required for a single, a cube would not be any disadvantage in a bi-unial or triple. These square limes would pack much better, and could, I should think, be compressed much easier by the maker.

Believe me, yours sincerely,

FRED. J. SCRIMGEOUR.

Dundee.

STANLEY SHOW, PHOTOGRAPHIC SECTION.

To the Editor.

SIR,—Will you kindly announce in your columns that at the nineteenth annual show of the Stanley Club will be held the fourth photographic section, from November 22nd to 30th.

Prospectuses and full details will be ready shortly, and may be obtained from

Yours, etc.,

WALTER D. WELFORD,

Manager.

59 and 60, Chancery Lane,
London, W.C.

—:o:—

Notes and Queries

A.H. Howkins.—The jet by the Manchester Oxygen Co. should suit your requirements.

Herbert Rawson writes about a second-hand lantern which he has had refitted, and which will not give an image larger than 1¼ inches in diameter. If he will rack the lens or move it by some means closer to the slide he should overcome his difficulty. the lantern being of course placed further from the screen. If this will not answer and he likes to forward the objective to us, carriage paid, we shall be pleased to examine it and tell him wherein the difficulty lies.

J.M. McKay—The reason of the dissolver not blowing the tubes off in the case of the blow through jets, was because the leak was not apparent under the low pressure. With the mixed jet both gases were at higher pressure and leaked doubtless in the manner you state, but unless we examined the dissolver we could not definitely state any reason other than that suggested.

Albert Lawson.—1. Yes, the special finish internally has a lot to do with the intensity of light. 2. Steward, of 406, Strand; Newton, of 2, Fleet Street; F. Brown, 13, Ossulston Street, all of London.

S. Knight, Junr.—1. Yes, the saturator mentioned is an excellent one. 2. About six ounces of ether for two hours. 3. About four and a half feet per hour. 4. The usual price is 6d. or 7d. per four ounces.

A Subscriber.—They are a mystery, but you will see from this journal that the restrictions have fallen through.

H. N. Houghton.—The advertisement appeared in this journal some time ago *re* the gelatine films, and it is again sent in for insertion in this issue, see advts.

Member.—We quite agree with you that the first meeting of the Lantern Society held a few days ago savoured too much of a lantern dealer's shop.

W.S.D.—We do not know why you should pay a subscription to enable dealers who are not members to come to the Society and advertise their wares. We do not, as you state, control the Society, but simply act as honorary auditor. The secretary is the proper person to approach, but you can surely bring your suggestion before one of the meetings.

Single.—Messrs. Noakes and Son, of Greenwich, will supply you with a screw down valve ready to attach to a cylinder, but of course you will require to let them know the shape of the valve piece of cylinder.

Saturator.—Yes, he is the same Mr. Timberlake whose fame in connection with cycles was known everywhere a few years ago. We understand he makes for the trade.

Swindled.—We cannot publish your letter, nor can we express any opinion thereon. We would suggest that you put the matter before a lawyer.

A. H. Short.—(1) We never institute comparisons between the same class of goods by different makers. (2) Either of the lamps will give better illumination than the incandescent, but there is not much difference. (3 See Butcher's advertisement.

P. R.—They will both appear in next issue.

J. Boyle.—Too late for insertion in this Journal.

Bluse.—The horse without neck and head on one glass, and the head and neck on the glass that is made to swing.

Amateur writes:—"Will you please tell me how to stain brass blackish, varnish will not do for my purpose as it would get scratched, I enclose 1s. for the information." *Ans.*—Having cleaned the metal, coat with a solution of nitrate of silver and nitrate of copper, and heat until the desired colour is obtained. The money, less 1d. postage, was returned, as we make no charge for answers in this column.

Sydney Burrows.—The addition of a small piece of camphor will prevent it turning sour.

Inventor.—The patent was taken out in 1886, and is dated June 1st.

W. L. Jones.—Mr. Hughes, of Kingsland, used to make metallic bindings for lantern slides, and we have not learned that he has discontinued it. Write him.

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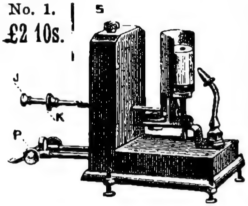

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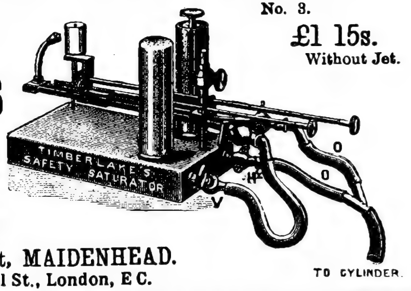

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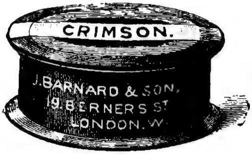

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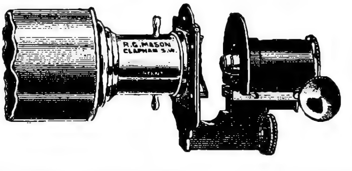

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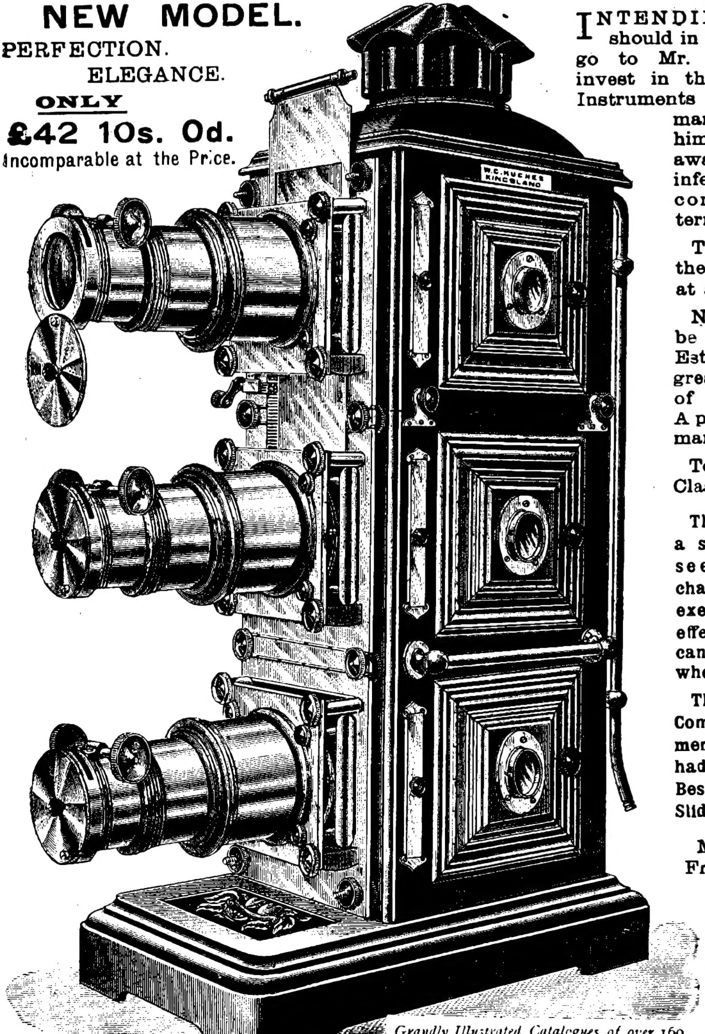

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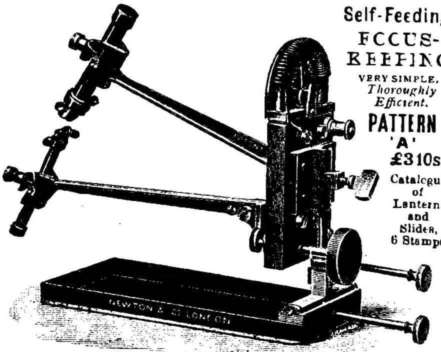

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